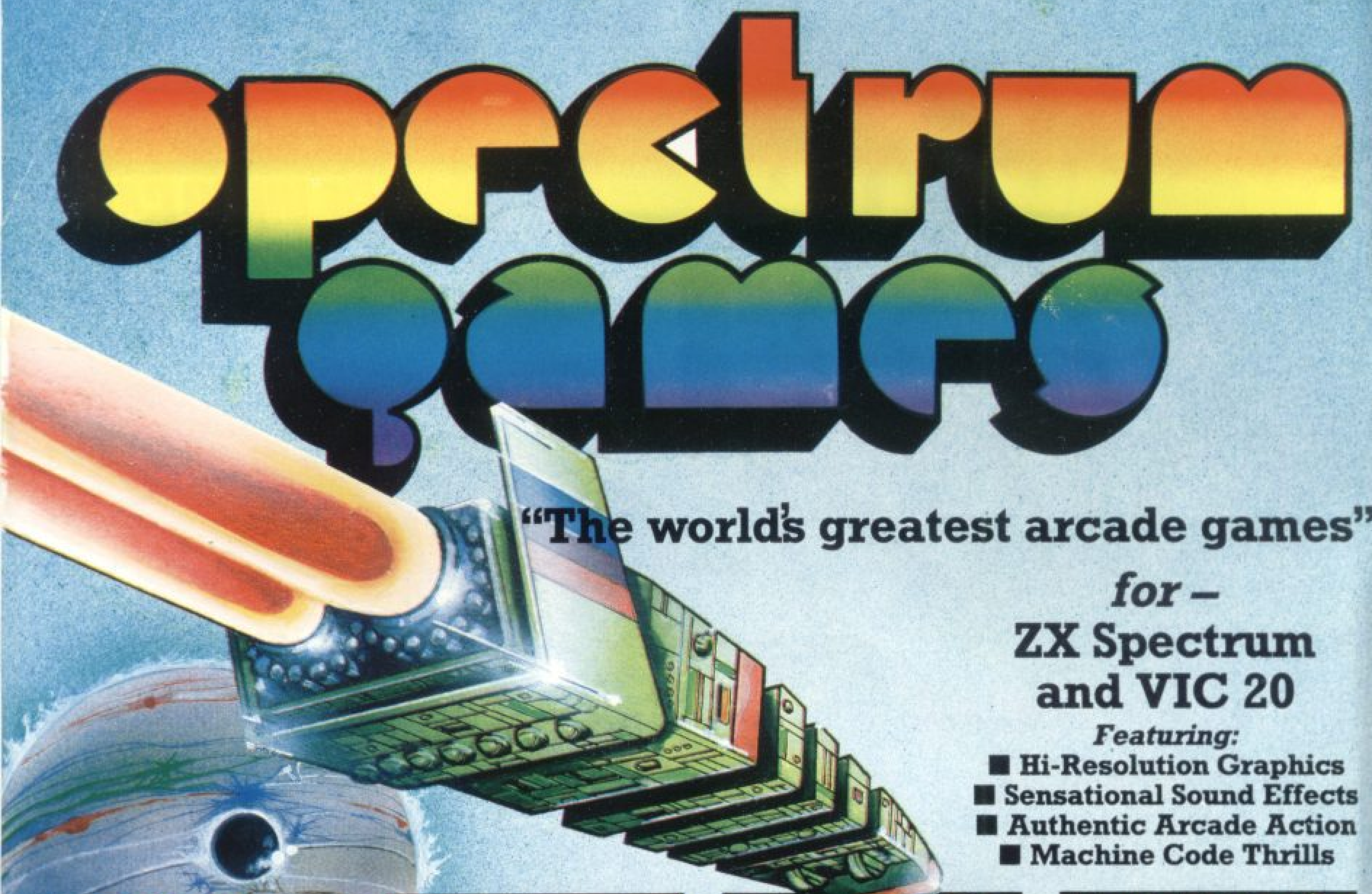
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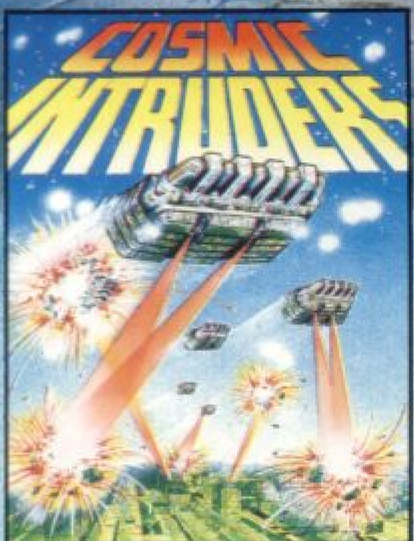
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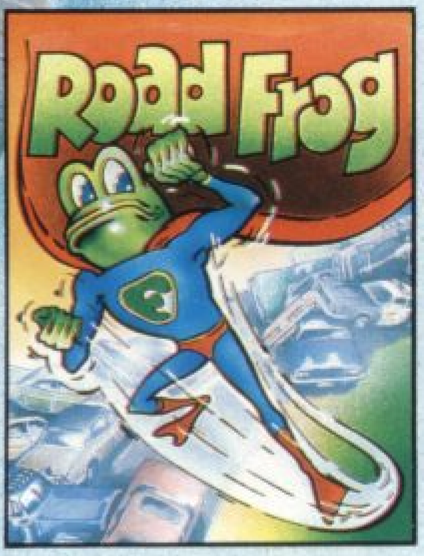
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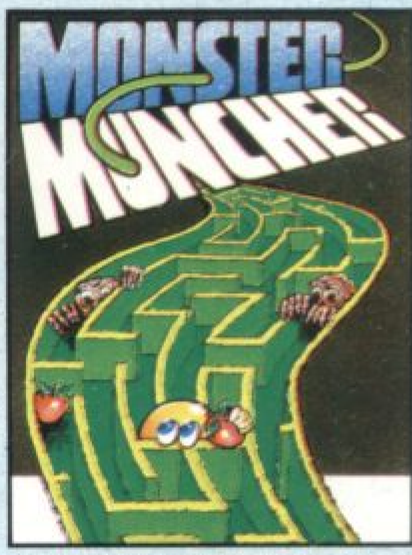
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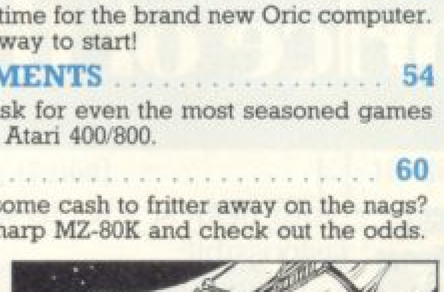


News & Reviews

Listings







Swords and surgery

Do adventurers get you down? Does the troll on the bridge, refusing all treasures make you tense?

Can trying to find a way out of the coloured mirror maze, make you look at yourself in a new light? Here at *Computer & Video Games* we've seen too many fine adventurers go to the wall — and end up banging their heads on it.

We know the pain and suffering a tough adventure can cause and we've opened up a helpline to Keith Campbell. Keith knows his way out of more adventures than most trolls have had hot dinners. Those he can't help with, he will throw open to the *C&VG* readership, to find an answer. **All on page 83.**

Features

Editor Terry Pratt, **Staff Writer** Eugene Lacey, **Editorial Assistant** Clare Edgeley, **Reader Services** Robert Schifreen, **Art editor** Linda Freeman, **Designer** Linda Skerry, **Production editor** Tim Metcalfe, **Advertisement manager** Rita Lewis, **Advertising executives** Louise Matthews, Mike Cassall, **Advertisement assistant** Louise Flockhart, **Publisher** Tom Moloney

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Cover: **Hunt Emerson** Next issue: **June 16th**

NOW LET OFF SOME STEAM

We've had a few unfortunate experiences with software but luckily in our privileged position we can vent off some steam through the *C&VG* Reviews pages.

Up until now, you have not had the same opportunity to warn people about your own software disasters.

Now, things are different. *C&VG* is going to give over a page or two each month to Great Software Disasters, which will be written by you, the readers.

If you have bought a piece of software — or a peripheral, or even a computer — which you feel does not live up to its marketing blurb please write in and tell us.

Reviews of bad software are just as important as reviews of good. And we strongly feel that the software houses which really do believe in quality rather than putting out any title which may make a killing in the short-term, should be supported. The only restriction we will put on this column is that the manufacturers will be allowed a right of reply before we publish.

The first offering is a delightful rundown of one man's experiences with an Oric Computer. Keith Ollett is the man behind Aeiric Bloodaxe or How I Learnt to Live With an Oric. Not only does it tackle one man's struggle to adapt to a new micro but it does so in a way that had most *C&VG* staff stifling giggles and we also get the feeling that before too long Mr Ollett is going to form an undying affection for the new companion in his life.

Read about Aeiric Bloodaxe next month and if it reminds you of some of your own experiences in the microcomputer market then write and let us know. It doesn't have to be as long as Mr Ollett's piece, just long enough to get your views across.

NEXT MONTH

Hot on the heels of the Book of Video Games comes an expanded Video Screens section for *C&VG's* TV games centre readers.

There is a whole host of new games cartridges plus a range of new machines, like the Vectrex and the Colecovision. All of which gives us more to tell you about each month.

C&VG already leads the rest in its information on the video games scene, so for the latest news and the most trustworthy reviews test out our expanded Video Screens section next month. After all, the next generation of microcomputers may well burst out of this market.

NEXT MONTH

Vibra seats, holophonics and laser discs may still be a little bit beyond what Britain's arcades are currently capable of. But they are still ready to pull out a few surprises.

Like Tip Top, a 3D version of Donkey Kong which sets an explorer down in the jungle, dodging 3D coconuts as he tries to get his own back on a mischevious ape.

There's also a rundown of Buck Rogers, the futuristic space ace who has found his way into a video games cabinet and the right way to approach the World War II game Frontline.

Plus arcade tips on new favourite Donkey Kong Junior.

NEXT MONTH

There's games in them thar pages of the July *C&VG*.

Games enough for everyone as we are packing in an extra listings-only section. 32 pages packed with versions of popular games for all kinds of microcomputer — on *top* of our normal selection of games programs.

Spectrum owners are in for a bouncing climbing treat with both Donkey Kong and Donkey Kong Junior putting in an appearance on their machine. Donkey Kong features the second screen of the arcade game with fires and ladders and Mario knocking the plugs out of the construction below Kong's feet.

DK Junior features the vines, snap-jaws and fruits of this increasingly popular arcade game.

Defend, Bug Battle, Spike Attack, Meteor, Draughts, Labyrinth and old favourites, like: Munchmen and Ninek's Invaders will be among the titles to take your mind off the forthcoming summer holidays.

COMPUTER GAMES TOP TEN

Sinclair Spectrum

1 The Hobbit (Melbourne House)
2 Arcadia (Imagine)
3 Penetrator (Melbourne House)
4 Horace Goes Skiing (Psion)
5 Time Gate (Quicksilva)
6 Flight Simulation (Psion)
7 3D Tunnel (New Generation)
8 Blind Alley (Sunshine)
9 Spectral Invaders (Bug Byte)
10 Planetoids (Psion)

Atari 400/800

1 Defender (Atari)
2 Pacman (Atari)
3 Galaxians (Atari)
4 Star Raiders (Atari)
5 Zaxxon (Calisto)
6 Centipede (Atari)
7 Miner 2049'er (Tigervision)
8 Missile Command (Atari)
9 Choplifter (Creative software)
10 Qix (Atari)

Vic 20

1 Jelly Monsters (Commodore)
2 Choplifter (Creative Software)
3 Star Battle
4 Blitz
5 Sargon II Chess
6 Skramble (Rabbit)
7 Gorf
8 Cosmiades (Bug-Byte)
9 Vic Panic (Bug-Byte)
10 Hoppit

ZX-81

1 Flight Simulation (Psion)
2 3D Defender
3 Mazogs (Bug-Byte)
4 QS Galaxians/Gloops (Quicksilva)
5 Space Radiers (Psion)
6 Thro the Wall/Scramble (Psion)
7 3D Monster Maze (J. K. Greye)
8 Gulpman II (Campbell)
9 Gobbleman (Artic)
10 Chess (Psion)



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JUMBO AND SUBMARINE

Dear Sir,
I would like to point out that our program Jumbo Jet Pilot, currently available for the Atari 400 and 800, is not being developed for, and shall not be available for, any other computer.

Submarine Commander is currently under development for the Commodore Vic-20 and is being considered for development for the Texas Instruments 99/4A. No release date has yet been set for either program.

Mike Dixon,
UK Sales Manger,
Home Computer Software,
Thorn-EMI,
London.

RETURN OF KRAZY KONG!

Dear Sir,
A friend of mine consulted me about a game program from your magazine for the Pet called Krazy Kong (February 1983 issue) as it would not work.

Apart from typing errors, the main cause was that it was written for a 9 inch screen Pet and used a PEEK to find the value of key pressed (PEEK 151). Unfortunately, 12inch screen 4000 series Pets give different values to the earlier small screen, a fact not widely known.

To convert the program to be universal (on all except the Basic 2 version machines) it is necessary to change the following lines in the program.

Line 20: Replace with lines 15 to 25
Line 170 to 240: Change variable S to S1
Lines 1050 to 1090: To use variables Z1, Z2, Z3 & Z4
Lines 1220 and 1230: Change variable S to S1

With these amendments, the program will run on most Pets . . . an excellent game in my opinion. If anyone wants to check the value for any key pressed, the following program will show them.

```
1 A = PEEK (151) : PRINT A
2 GO TO 1
```

Amendments

```
Line 15: K = 41: P = 40: H = 39: REM FOR CURSOR
Line 18: REM 9INCH SCREEN VARIABLES
Line 22: REM 12INCH SCREEN VARIABLES
Line 25: IF PEEK (57344) = 76THENS=52:Z156:Z2==50:Z3=62:Z4=60:Z5=54
Line 1050: IFA=Z1THENIFPEEK(J−P)......
Line 1060: IFA=Z2ANDA1.........
Line 1080: IFA=Z3THENGOSUB500
Line 1090: IFA=Z4THENGOSUB600
```

John Bloore,
Kingswinford,
West Midlands.

ROCKFALL DODGES!

Dear Sir,
There are two reasons why readers may have difficulty in getting Rockfall printed in your March 1983 issue, to work. First, the printer used to obtain the listing appears to have a different character set to the one on the BBC.

This, of course, has the effect that certain BBC characters are replaced by certain non-BBC characters on the listing.

This effect occurs on the following lines:
LINE 10, " ↑ " SHOULD BE "[" (WHICH IS DISPLAYED AS "←" IN MODE 7)
LINE 10, " ↓ " SHOULD BE "/" ("½" IN MODE 7)
LINE 60, "←" SHOULD BE "]" ("→" IN MODE 7)

Secondly, the program does not work on an Operating System 1.2 machine due to the method it uses to read the keyboard. Corrections should be made as follows:

```
530 Z% = Y% + X% : A% = INKEY (−26) — INKEY (−122)
600 M% = A% : C% = Z : X% = X% + A% : IF X% C0 X% = 0
```

It would also be a good idea to replace "OPT0" on line 10 with "OPT2".

David Mc Keran,
Sunderland,
Tyne & Wear.

WHERE CAN I TURN TO?

Dear Sir,
I am keen to learn more about my Oric computer but do not know who to turn to as I am new to computing. Can you please advise me whether any groups or any other ograrisations for Oric users that I can turn to for help exist at the moment?

Julian Douglas,
Hartsholme,
Lincoln.

Editor's reply: The Tangerine Users Group (TUG for short) is offering its services to Oric owners and the organisation can be contacted at: 1, Marlborough Drive, Worle, Avon BS22 0DQ.

But Bob Green of TUG tells me he is currently overwhelmed with response from Oric owners and delays of 14 days before the organisation can get back to enquirers, are inevitable.

COLOURFUL SKYSCRAPER

Dear Sir,
I have a few modifications to suggest that will introduce a dash of colour to the Skyscraper program printed in April's *C&VG*. For example, the following changes will give, a yellow plane, a red bomb, black background and blue skyscrapers:

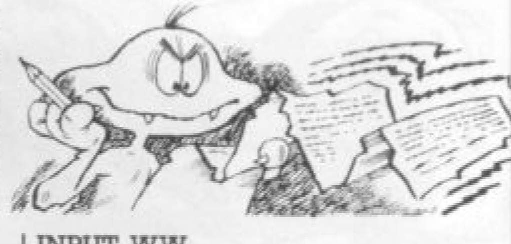
```
30 FOR K = 0 TO RND(12): POKE J-K*32,175: NEXT:NEXT:REM SKYSCRAPER COLOUR
40 PL$ = CHR$(158)+CHR$(155)+CHR$(146):REM PLANE COLOUR
50 NP$ = STRING$(3,CHR$(128)) :P0 = 32: BO$ = CHR$(177):RA=5:SC=0 :REM BOMB COLOUR
80 IF PEEK (PO+1026) = 175 THEN CLS:PRINT @ 150, "SPLAT" : PRINT "YOU CRASHED INTO A SKYSCRAPER!": PRINT "YOUR SCORE WAS:-";SC: GOSUB 2500: PRINT "DO YOU WANT ANOTHER GO?";: INPUT U$ : IF LEFT$(U$,1)="Y" THEN 5 ELSE END: REM DETECTS SKYSCRAPER COLOUR WHEN CRASH OCCURS
1000 IF SP + 32 479 then BD = 0:POKE SP + 1024,128: RETURN ELSE IF PEEK (SP+32+1024)=175 THEN POKE SP + 32 + 1024, 128: ......... (Rest of line as printed): REM DETECTS WHEN BOMB HITS SKYSCRAPER
```

The colours can be changed to any of the eight colours available, simply by adding the appropriate CHR$ codes, listed on page 138 of the user manual, to the values given in the, all green, original version printed in your magazine.

E. U. Lovesay,
Norwich,
Norfolk.



MAILBAG



FEMALE FAN MIXES IT!

Dear Sir,
I would like to say a word of appreciation for your magazine. We have had Texas TI99/4a for around four months.

Yours is the only magazine which regularly has listings and adverts for our super fantastic machine. The machine is great — wonderful keyboard, excellent display, clear sound, enormous ROM (Edit Mode is super!)

For other Texas TI 99/4a fanatics here is a colour mixing program discovered by Ian Ellis, aged 10, a friend of my son's:

```
100 CALL CLEAR
110 CALL SCREEN (16)
120 INPUT "FIRST
COLOUR":A
130 INPUT "SECOND
COLOUR":B
140 CALL COLOUR (9,A,B)
150 CALL CHAR
(97,"55AA55AA55AA55AA")
160 CALL HCAR (1,1,97,768)
170 GOTO 170
```

It gives an apparently unlimited number of shades and colours.

By the way — are there any other female computer fans out there?
Hazel Perkins,
Adel,
Leeds.

PLUGGING A NEW MACHINE

Dear Sir,
Please could you tell me the price of the new Colecovision you have mentioned in your magazine, and when it will be available. I have an Intellivision games machine and was wondering if I could put Intellivision games onto the Colecovision or vice-versa. I have also read in your magazine about a module which plugs into the Colecovision and allows it to take Atari games — will I be able to fit this module to my Intellivision?
Paul Hanks,
Stroud,
Gloucestershire.
Editor's reply: The Colcovision will be on sale at most major high street stores, electrical chain stores, such as Rumbelows, Greens, Dixons, and Boots, in May. The basic unit, which includes joysticks and a copy of the Donkey Kong cartridge, will sell for £149.99. The Atari adaptor, which enables you to play VCS games on the Colecovision will be available at a slightly later date and will retail at £55. No Intellivision adaptors are available yet.

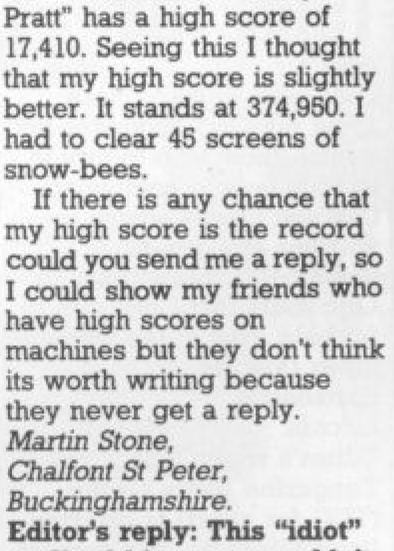
HIGH SCORE FOR PENGO

Dear Sir,
In the February issue you gave a good description of Pengo. Which was great because my local newsagent had just installed the game.

Now in the March issue some idiot called "Terry Pratt" has a high score of 17,410. Seeing this I thought that my high score is slightly better. It stands at 374,950. I had to clear 45 screens of snow-bees.

If there is any chance that my high score is the record could you send me a reply, so I could show my friends who have high scores on machines but they don't think its worth writing because they never get a reply.
Martin Stone,
Chalfont St Peter,
Buckinghamshire.
Editor's reply: This "idiot" realised his score wouldn't stand for long — but thought it might set a target for other Pengo freaks to aim at Martin.

Please tell your friends to use their top scores by entering our 1983 Video Games Championships. See page 10 of this issue.



HOTLINE FOR PET

Dear Sir,
We are starting a Pet Monthly newsletter service.

It will contain programming hints and tips plus information regarding copyright, submission to periodicals/publishers, etc., technical information for hardware circuitry plus program listings, plus a "hotline" telephone service. Annual subscription is £7 and should be sent to the address below.
Aquarius Software,
10 Kenneth Road,
Pitsea,
Basildon,
Essex.

DOGFIGHTER CONVERSION

Dear Sir,
I tried to enter the Vic-20 Dogfight program featured in your December '82 issue into my schools' Vic. My school has the Vic 1211A Hi-Res super expander but no joysticks. Listed below are the conversions needed to run the program without joysticks.

The following lines should be changed:

```
40 GET S$
45 IF S$=r" "THEN GOSUB
s$$
46 IF S$" "THEN X=X:Y=Y
50 IF S$="S" THEN B=1
60 IF S$="A" THEN B=2
67 IF S$="W" THEN B=3
70 IF S$="X" THEN B=4
```

These conversions give the following controls:
Dive=W, Climb =X, Left=A, Right=S, Fire=Space bar.
Kevin Hall,
Hull,
N. Humberside.

SLOW DOWN DRAGON!

Dear Sir,
I typed in the 'Dragon Run' listing in your April '83 issue, which worked perfectly. Try adding these few extra lines. They will slow the game down if you think it's too fast!

```
31 ? CHR$(125)
32 ?:? "ALSO, PLEASE ENTER
SKILL LEVEL"
33 ? "(1=hard, 9=easy)";:
INPUT WW
34 TE = 10*WW
```

And change the beginning of line 130 to:
130 FOR I=1 TO TE (the rest of the line remains the same).

I am glad to hear that the Atari range of computers have gone down in price again. The 400 may still not be the best value, but for the little extra money you get some of the best sounds and graphics of any home micro. A look at a few of the new game cartridges, like Defender, will prove me right.

I would like to send a message to all Atari owners — to get the most from their machine, they should join an owners club, and if there isn't a local one, be adventurous enough to start one.
Edward Tilsley,
Eastcote,
Middlesex

THE PLANET OF DEATH

Dear Sir,
I felt compelled to write after playing my first ever adventure. I need help!

What do I need the slimy gloves for? Why is the green man so unfriendly? What does the dance music mean? Why won't the computer — down the pit, behind the wind tunnel — talk to me?

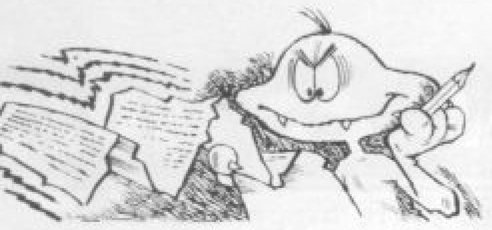
These are just some of the many questions arising after having entered Artic's 48K Planet of Death for the ZX Spectrum. The story so far:

I found myself on a mountain plateau, with only a piece of sharp flint for company. I pick it up, and move into a damp limestone cave with a picture of a man climbing down a pit using a rope.

Moving on, I finally collect rope, a pair of boots, a broken floorboard, a laser gun and some stones.

Making my way to the bottom of the pit, I find the green man. I shake his hand, and he throttles me. Oh no not again!

Sometime later I arrive once more at the side of the green man who sleeps on the mirror. This time I shoot him and he goes up in a puff of smoke leaving behind him a broken mirror. I pick the



MAILBAG



mirror up too, after first putting on the boots.

Exploring further, I find a wind tunnel, a pair of slimy gloves and a computer with a keyboard — which refuses to communicate.

I also find a key. I have to drop an object now (the floor-board which I have used and broken) and pick up the key which in nearly all adventure games is like the heart of an artichoke — you have to go through an awful lot to get at it, but it is usually worth it in the end.

Having loaded myself up with miscellaneous objects I try the key in all the prison cell doors — it doesn't fit any of them. (You have to kick the barred window to get out.)

I fix my laser at the force field, twice weakening it, but the third shot having no effect. Where to go now?

Please, anyone out there, tell me what to do. This must be one of the most annoyingly addictive adventures for the Spectrum. I'm hooked anyway. I'll find my spaceship if it's the last thing I do. Anyway I'm stuck in the maze to the north of the strange house.

A. Buchan,
Aberdeenshire,
Scotland.

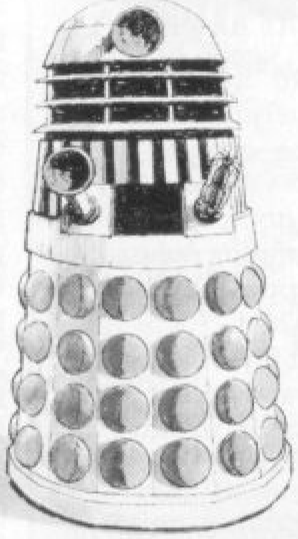
Editor's reply: Sounds like you are in dire straits Mr. Buchan. But help is at hand. Keith Campbell is offering aid to lost adventurers on his page and we have forwarded your letter to him for answer in a future column.

FULL SCREEN ON TEXAS

Dear Sir,
As a TI 99/4a owner I would very much like to thank you for the two games published recently, it is most gratifying to find a popular magazine taking an interest in this excellent machine at last.

I would also like to take the opportunity to say how much I enjoy your magazine and appreciate its excellent layout and use of diagrams. I do love a good picture or two!

If anyone is interested, here is a little technique I use for printing full screens on



the Texas.

```
100 CALL CLEAR
110 CALL
CHAR(97,"FF01FF80FF01FF00")
120 CAL
CHAR(98,"EEAAAAAAAAAA
AABA")
130 FOR I=1 to 24
140 PRINT "aa(two
spaces)babababababbbbabab-
aba (two spaces)aa"
150 NEXT I
160 GOTO 160
```

Lines 110 and 120 redefine characters "a" and "b" and the print statement in line 140 positions them where they are required. Most of the other console characters can be used in a similar fashion.

S. W. Sorsbie,
Tenterden,
Kent.

COLOUR ON THE WAY

Dear Sir,
I am a proud CoCo owner and would be obliged if you could please print a program for the TRS-80 colour computer.

There are many CoCo users who receive your excellent magazine but we still wait for a program to be printed within the pages of *Computer and Video Games.* I am nearing completion of a program at this moment, and when I have finished, shall send it in.

If you print this letter, I'm sure it will inspire many users of this most versatile computer on the market, to put finger to keyboard.

Jeremy Hughes,
Haverfordwest,
Dyfed.

Editor's reply: We hope your letter has the desired effect Jeremy. We await the arrival of your TRS-80 colour program with anticipation. So far our vaults do not contain any!

EXPANDING GRAPHICS

Dear Sir,
I live in Hong Kong and have a Vic-20. Recently I bought a 16k RAM expansion pack for my Vic. Over the last few days I have been ripping my hair out trying to create my own characters in my expanded Vic machine.

Before I expanded I used location 7168 to place my programmed characters. To protect it from being overwritten by Basic I changed the pointers to the top of available RAM at locations 52 and 56 so that they point below the character set.

Needless to say, this precaution is fruitless when the Vic is expanded because some RAM vectors are altered, e.g. those pointing to the Basic program and the screen.

Wai Keung,
Tuen Mun,
Hong Kong.

Editor's reply: To protect your character set use the following program, it will relocate the screen to its proper address. You can then put your character set in locations 4096 to 7696.

```
10 for X = 1 TO 7
20 READ LOC,DAT
30 POKE LOC,DAT
40 NEXT X
50 SYS(0)
60 DATA 648,30,642,32,
36869,240,36866,150,0,108,1,
0,2,192
```

This resets the appropriate pointers on an expanded Vic and then performs a reset.

HELPING THE DOCTOR . . .

Dear Sir,
Whoever checked the Dr Who game in the March issue wants putting down a black hole! It's impossible to get into the Doctor's Tardis!

If however, you change line 520 to read . . . IF L<>46 you CAN save the universe.

Apart from that small error, and the fact that the description page read like a "made in Hong Kong" instruction manual, it's a good game!

Ken Ward,
Lakenham,
Norwich.

Editor's reply: Even a black hole can't swallow the *Computer and Video Games* office!

APPEAL FOR NEW CLUB

Dear Sir,
I would like to ask your readers if there is anyone in the Manchester area who would be interested in forming a computer club for the TI 99. If so, perhaps they would contact me with any ideas they may have.

T. A. Grimshaw
Longsight,
Manchester.

Editor's reply: Anyone who is interest should contact the *Computer and Video Games* office for Mr. Grimshaw's complete address.

COLOURS ON THE ORIC

Dear Sir,
I think you ought to warn people about the Oric 1 advertisements which have been appearing in computer magazines like yours.

It says that the Oric 1 has sixteen colours, which is not true. It has eight colours, like the majority of computers in the £100-£200 price range.

The reason why Oric say it has sixteen colours is that they think that the background colour and the ink colour is completely different.

With that assumption in mind, you could say that the ZX Spectrum has a total of around fifty-six colours, a different combination of colours using FLASH, BRIGHT, PAPER, INK and BORDER.

Keep up the good work with your fantastic magazine, and the great artwork!

Shaun Dodson,
Haxby,
York.

SCORES START TO MOUNT

The high arcade scores of would-be champions are beginning to mount in the Computer & Video Games office.

A whole host of machines are proving their popularity but few clear leaders have so far emerged. Many players have stayed with tried and true favourites which have been languishing in arcades for years while others proudly sign their name beside the latest games on the market.

Asteroids, Pacman and Scramble feature among the older games still finding favour with video gamers. James Thomas of Fishguard has taken an early lead with his signed Scramble score of 3,672,820 from the Cleddau Leisure Centre in Haverford West. But the rest of the Scramble scores are languishing well behind.

Jonathan Rees must be suffering from a bad case of Pacman finger after achieving over two million at the Carousel Amusements in Southport. Another two million plus score was notched up by Andrew Freeman of Pitsea Pool in Basildon on Asteroids.

Donkey Kong and Robotron are among the games being battled over by other arcade veterans. Some 569,000 from Mark Neale was witnessed in the Boscombe Pier Amusements on Donkey Kong while current top Robotron ace is R. Cooper whose score of over nine million stirred the locals in the De-Luxe arcade in Hastings.

Among the recent games vying for position are: Amidar and the popular Mr Do plus my own favourite, Pengo... but I won't be featuring in the final after seeing the latest scores on that.

BE A CHAMP

A brand spanking new arcade game, not previously released in the UK is still to be claimed from Taitel Electronics.

The prize will go to our 1983 Video Games Champion when he has seen off all opposition at the grand final on July 7th.

To qualify for that final, simply cut out the form below and take it down to your local pub or arcade or wherever your favourite machines can be found.

Put up the best score you can on the machine and when you reach a score you're happy with, ask the arcade or pub manager to sign the form to witness it. You can repeat this process on any two other machines which you fancy your chances on, or purely send the form off to us at *C&VG* in an envelope marked: 1983 Video Games Championships, Computer & Video Games, Durrant House, 8 Herbal Hill, London EC1R 5JB.

If you mess up this form write or phone and we'll send you another one. You can enter as many times as you like before the June 23rd closing date — but don't leave it too late as the vagaries of the post may mean your scores arrive too late.

Please enter the following scores in your 1983 Video Games Championships

My high score is: ....

It was scored on a:

.... machine

Date: ....

The manager of the pub/arcade who witnessed my score is:

....

His signature: ....

Name & address of pub/arcade:

....

....

My high score is: ....

It was scored on a:

.... machine

Date: ....

The manager of the pub/arcade who witnessed my score is:

....

His signature: ....

Name & address of pub/arcade:

....

....

My high score is: ....

It was scored on a:

.... machine

Date: ....

The manager of the pub/arcade who witnessed my score is:

....

His signature: ....

Name & address of pub/arcade:

....

....

My name is: ....

Address: ....

....

.... Tel: ....

The three best scorers on each of the most popular machines will be given expenses paid trip to London to take part in the final against one another and a star personality.

Please ensure your entries are witnessed by the arcade manager or operator so we can verify the scores. And be prepared to keep July 7th free if you're particularly proud of your top scores.

If your arcade or pub owner is displaying a 1983 Video Games Championships poster he will also have a dispenser of application forms for you to enter on, should you be reluctant to cut this form out of your copy.



Confessions of a Bug

Dear all,

Only one thing to come clean on this issue. For all you T.I. 99-ers who couldn't pass our colour blindness test on Ski-ing in May, I've got to warn you about the perils of snow glare.

Any irate phonecall or a letter to the offices of *C&VG* will result in a purely black and white listing being returned to you in the post.

The editor assures me that hands have been chopped off and the people responsible been assigned to work on the Seventh Empire.

Meanwhile here are some corrections.

```
300 FOR M=A TO B
730 IF (C=70) + (C=73) . . .
980 CALL CHAR (35, " 3C4299 . . .
1310 FOR M=1 to 600
1430 DATA 30, 11, 1, 1, 12, 10, 11, 12, 29,
30, 12, 1, 1, 13, 9, 14, 13, 22, 30, 13, 1, 1, 14,
5, 15,14, 21, 3, 0, . . .
1450 DATA 3, 8, 3, 5, 5, 5, 5, 8, 2, 11, 4, 11,
4, 17, 6, 17, 3, 22, 5, 22, 7, . . .
1460 DATA 13, 19, 10, 15, 12, 15, 8, 10, 10,
10, 10, 7, 12, 17, 13, 2, 13, 4, 16, 4, 16, 2, 17,
9, 19, . . .
1580 FOR X=8 TO 14 . . .
2230 CALL HCHAR (24, 1, 32, 32) . . .
2260 CALL HCHAR (XX, Y, 9, 120)
```

Yours Mal.

HELP BUYERS MAKE THE RIGHT CHOICE

When you bought your computer did you go for the one with the impressive pattern display or the one conducting its own sales patter.

Well, Atari is giving you a chance to influence the way its computer is represented in the future.

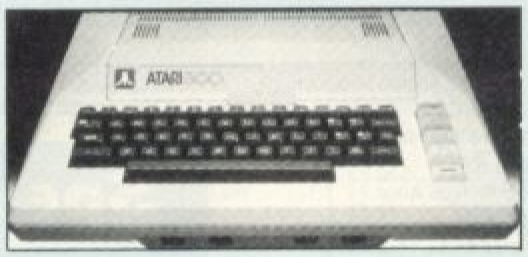
In conjunction with the high street electronics chain of Dixons and ourselves, Atari is setting up a competition to get your ideas on how its computers can best be presented to the perusing public.

Dixons provides a good example of how high street stores have taken home computers to their hearts. The Dixons shelves are now packed with many different brands battling for attention and giving buyers a chance to run their hands over a host of different keyboards.

But trying out a quick loop can hardly be a buyer's benchtest. He should see the micro running at its best before he makes his judgement. Obviously Atari are confident about their machine but how would you show it in its best light?

An Atari 800 microcomputer goes to the winner, or — if you already own an Atari — you can opt for a disc drive and an equivalent value in Atari software as a prize.

To enter the competition, simply write a program in Atari Basic which sets the computer off to the best advantage. Making the best use of the colour graphics and sound facilities of the machine.



The best of the programs will hopefully feature in future Dixons store demonstrations, helping to entice people to buy Atari computers.

There will also be three runners-up prizes of the latest Atari software.

Judging will commence on June 16th and we'll need your entries in by then.

My own view of in-store displays of microcomputers is that they era on the side of the technical and verbose, instead of getting down to demonstrating some hot game action. But, luckily, it is being judged by Dixons' and Atari's experts, so you'll have a free reign to produce the best display for all kinds of computer usage.

The competition is not open to employees of EMAP, Dixons or Atari or their relatives and the judges' decision will, of course, be final.

SEVENTH CHANCE TO ENTER

The reappearance of The Seventh Empire has been met with roars of approval from the players and groans of horror from the poor devils who are tied to the Empire computer while it decides the fate of the galaxy.

But with a Colecovision as the star prize in the game, we couldn't let the game suffer its demise for too long. So it will soon be making a triumphant return — allowing a fresh start to all those who may have lost a fleet.

We can now replace players who have had to drop out of the game for one reason or another. So if you have been disappointed in the past, not to be playing Seventh Empire, then we are offering another chance.

First come, first served I'm afraid but fill in the form below and we will do our best to include you.

Please include me in the Seventh Empire game when it resumes.

I would like to name my tribe the . . . .

My name is: . . . .

Address: . . . .

Tel: . . . .

spectrum

NEWS from SPECTRUM

BBC

Now from **SPECTRUM** the outstanding **BBC 'B'** machine plus, Disk Drives & software see ad. opposite for details.

PRESTEL

See PRESTEL Page 600181 for up to date information from SPECTRUM

VISCOUNT DISK DRIVES

Coming soon! a fabulous new range of Disk Drives specially selected by **SPECTRUM** from under **£200** too! suitable for most micros inc. LYNX, COL. GENIE, DRAGON etc Ask your local **SPECTRUM** dealer for further details.

NEW SPECTRUM MEMBERS

Check our address page! - there are many new **SPECTRUM** dealers throughout the UK so there's a good chance there'll be a **SPECTRUM** centre near you.

INTRODUCING SPECTRUM FACTS!

Next to many of our offers, you'll find a few lines tagged **SPECTRUM FACTS.** We pride ourselves on providing you, the customer, with a **genuine service** as well as **super LOW prices,** and we want you to know that when you buy from a **SPECTRUM** dealer, you'll get **exactly the right micro for your needs. SO LOOK OUT FOR YOUR SPECTRUM FACTS!**

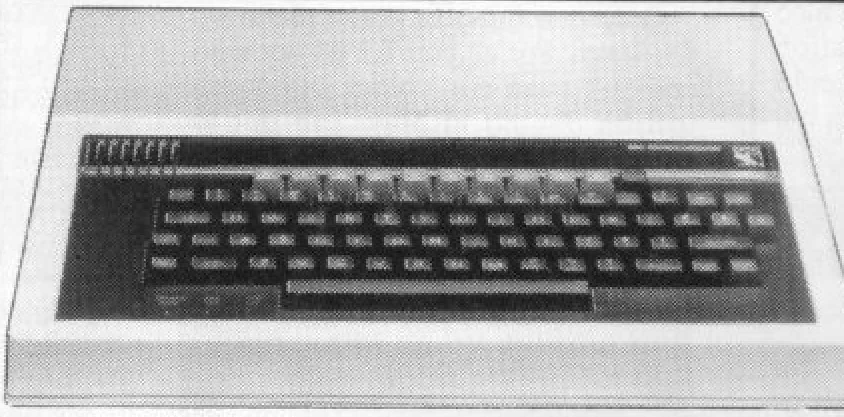
AFTER SALES CARE

SPECTRUM service centres will ensure that should your machine 'go down' **we will get it running again as quickly as possible.** We also offer **extended warranties** at reasonable prices too! - ask your **SPECTRUM HOME COMPUTER CENTRE** for full details.

COMPUTER DEALERS

The **SPECTRUM** dealer list is virtually closed. If your area is free and you'd like to join the waiting list, please write to **MIKE STERN, Spectrum (U.K.) Ltd, Burrowfields, Welwyn Garden City, Herts.**

BBC Model 'B' MICRO



Yes, this **top selling Micro system** is now available from your local **SPECTRUM** dealer -the **BBC Model 'B'** offering **32K RAM** plus a **full back-up of peripherals & software** too! It's an **infinitely expandable** machine, ideal for the **home or business** and is already widely used for **educational purposes in schools** -so the chances are **your** children may already be **well familiar with its operation,** which must make it the **ideal choice** for the **home** too! So if you're thinking of buying a micro you **must** take a look at the **BBC** at your local **SPECTRUM** dealer **NOW!** - but just one word of warning, initially stocks will be limited and **demand is bound to be great,** so please 'phone to check the stock position before making a journey.

BBC 'B' with Disk Interface	£470.50
BBC Disk Interface Kit	£95.00
BBC Single Disk Drive 100K	£265.00
BBC Dual Disk Drive 800K	£803.85
BBC Tape Recorder	£29.90
BBC Acorn Software Cassette based from	£9.95
BBC Disk based software	£11.50

Spectrum Price

£399.00 INC. VAT

Please Note! We regret that there is a tremendous shortage on all BBC equipment — please phone your nearest store before making a journey to check stock position.

SHARP MZ-80A



FREE! £75 WORTH of software with every MZ80A purchased

Desk top genius! the all-in-one SHARP MZ-80A. Ready to run the moment you get it home. Built-in keyboard. CRT. 9" display and cassette data storage with **48K RAM.** The BASIC with extra useful additions, offers quite a powerful micro for the home or business. ■ 4K Byte ROM 48K Byte RAM - 2K Byte Video RAM ■ ASCII profiled keyboard - numeric pad ■ 2page Video RAM allows screen to be scrolled up or down. ■ CP/M available.

Spectrum Price **£546.25** Inc. VAT

Floppy Disks and Accessories for MZ80A

Twin Floppy Disk unit (inc. 1/0 Card, Disk, Cable)..... £856.75
Twin Disk Unit (only).... £678.50
Single Floppy Disk Unit.. £460.00
Cable for F/D Drive...... £29.79

Printers and Accessories for MZ80A, MZ80B & MZ80K

80 Col Tractor Feed Printer inc. Cable. 1/0 Card & Rom. £477.25

ORIC-1



A superbly designed and engineered micro and great value-for-money from **SPECTRUM.** Offering **48K RAM Colour** - (8 foreground and 8 background can be displayed at same time) **High resolution graphics User definable Graphics. Full sound** (6 octaves of controllable sound) **Easy to use keyboard with moving keys. Standard Centronics parallel interface allows** easy connection to a wide range of printers etc

Spectrum Price **£169.95** Inc. VAT

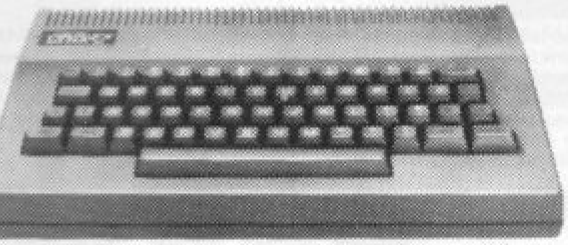
SPECTRUM FACTS

Maximum user RAM	47,870 Bytes
Text screen	28x40
High Resolution	240x200
Cassette Lead	Included

Not all stores carry every advertised item, please phone before making a journey — Prices correct at time of going to press E. & O.E.

The powerful and infinitely expandable

LYNX



Just look at this **super new LYNX Micro - an incredible** 16K & 32K video ram and that's expandable up to or beyond 96K. For just **£225.00 INCLUDING VAT** the **LYNX is exceptionally versatile.** All **LYNX's** 'add-on' connections are **standard types.** The high definition **colour graphics** make it a **top value choice** for the **home or office** (with expansion, the **LYNX** can become an 80 characters-per-line word processor!) Take a look at the **LYNX** - a memorable bargain from **SPECTRUM.** But please phone to check stock position before making a journey as this machine is bound to be in **great demand.**

Spectrum Price

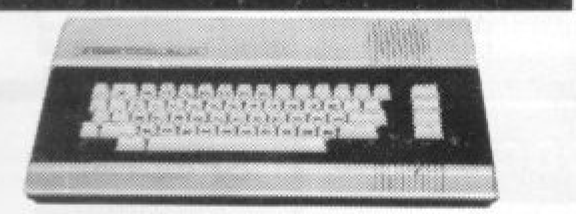
£225.00 Inc. VAT

VISCOUNT - Teach yourself LYNX BASIC **£6.95**

SPECTRUM FACTS

Maximum user RAM..... 13,700 Bytes (approx)
Text Screen 24x30
High Resolution 265x248
Cassette Lead .... Included

COLOUR GENIE



A truly reliable micro and highly recommended by **SPECTRUM** featuring powerful and sophisticated COLOUR GRAPHICS, allowing you to create full 8-colour Games, Diagrams and charts quickly and simply. Powerful 16KK RAM memory (expandable internally to 32K) for FULL COLOUR video games and POWERFUL COMPUTING with a full range of inexpensive accessories: 16K RAM pack, Joysticks for TV games, Light Pen, Disk Drive and a Printer. The superb Colour Genie is at SPECTRUM now - check it out and see the Genius at work!

Spectrum Price £224.48 Inc. VAT

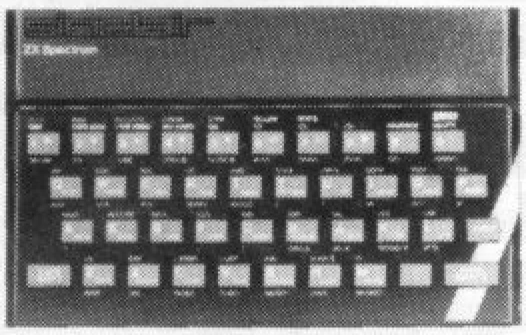
COLOUR GENIE ACCESSORIES

Joysticks £49.49
16K RAM £38.50
Printer Interface £39.95
VISCOUNT Teach yourself Colour Genie Basic £6.95

SPECTRUM FACTS

Maximum user RAM .... 14,200 Bytes (approx)
Text screen 24x40
High Resolution 160x90
Cassette Lead .... Included

SINCLAIR ZX SPECTRUM



Yes, this top selling micro is now available from Spectrum in both **16K** and **48K RAM.** So now there's no need to send by Mail Order - just call into your local SPECTRUM dealer and pick one up. But just one word of warning: with this added avilability advantage, stocks are bound to sell fast - so make it soon!

SINCLAIR ZX SPECTRUM 16K - £99.95
SINCLAIR ZX SPECTRUM 48K - £129.95

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

SINCLAIR ZX-81

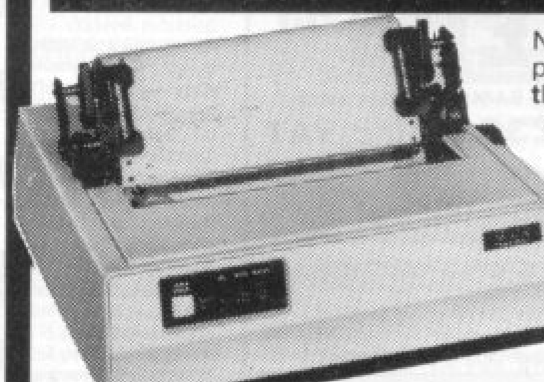


SINCLAIR ZX . . . £49.95
16K RAM pack . . £29.95
ZX Printer £39.95

Computer Bookshop Software for Sinclair Computers	INC. VAT
Bumper 7 1K ZX81	£5.95
1K Super Trio ZX81	£7.95
Labyrinth 16K ZX81	£5.95
Nightmare Park/Music 16K ZX81	£6.95
Computacalc 16K ZX81	£7.95
Personal Banking System 16K ZX81	£11.44
Space Invaders/Rescue 16K ZX81	£6.95
Breakout 16K ZX81	£5.95
Mugsy 16K ZX81	£5.95
Mergatroyds 16K ZX81	£5.95
Progmerge 16K ZX81	£5.95
Football Manager 16K ZX81	£7.95
Cassettes for ZX81 Type—10	
6 Games	£3.95
Junior Education	£3.95
Business & Household	£3.95
Skill & Judgement Games	£3.95
Junior Education	£3.95
Family Quiz	£3.95
Type—20	
Fantasy Games	£4.75
Space Raiders & Bombers	£4.75
Type—30	
Super Programs Nos. 1-8	£4.95
Type—40	
Backgammon	£5.95
Flight Simulation	£5.95
Type—50	
English Literature 1	£6.95
English Literature 2	£6.95
Geography	£6.95
History 1	£6.95
Maths. 1	£6.95

ZX-PANDA
16K RAM PACK
ONLY £24.95

OKI MICROLINE Printers



Now from **SPECTRUM** - this **top selling** range of printers **renowned throughout the world for their quality and reliability.** If you're thinking of adding a printer to your micro then you must take a look at the **MICROLINE** range at **SPECTRUM -NOW!** they're **fantastic value-for-money**

Models available

MICROLINE Model 80 £259.90
MICROLINE Model 82A £455.40
MICROLINE Model 92P £585.35

EPSON



The new EPSON

RX-80 and **FX** printers now available—check with your local **SPECTRUM** dealer **NOW!**

FX-80 Spectrum Price **£503.70**
RX-80 Spectrum Price **£332.35**

SEIKOSHA



GP-100A

Now a top quality graphic printer at a price you can afford. Centronics interface connects easily with most micros.
Spectrum LOW price **£229.94** Inc. VAT Cables & Interfaces available for most micros

SMITH CORONA

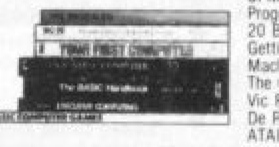


Model TP-1

Microprocessor controlled, high quality daisy wheel printer at a LOW cost from SPECTRUM. Serial, Parallel or IEEE Interface.

Spectrum Price £557.75
Inc. VAT

BOOKS



SELECTION FROM THE COMPUTER BOOKSHOP

30 Hour Basic for the BBC Micro	£5.95
Let your BBC Micro Teach You to programme	£6.45
BBC Micro Revealed	£7.95
Over the Spectrum	£6.95
60 Games and Applications for the ZX Spectrum	£4.95
Programming the 6502	£9.95
Programming your ZX Spectrum	£6.95
ZAP Pow Boom for the Vic 20	£7.95
The ZX Spectrum Explored	£5.95
Vic Inovative Computing	£6.95
Mastering Machine Code on your Zx81	£7.50
The ZX Spectrum and how to get the most from it	£5.95
Easy Programming for the ZX Spectrum	£5.95
30 Programmes for the BBC Micro	£4.95
CPM Handbook	£11.50
Programming the Z80	£11.95
20 Best Programmes for the ZX Spectrum	£5.95
Getting aquainted with your Vic 20	£6.95
Machine code and Better Basic	£7.50
The Cambridge Colour Collection (Spectrum)	£6.95
Vic Revealed	£10.00
De RE Atari	£17.00
ATARI Operating system listing	£10.43

MORE SPECTRUM LOW PRICES

Spectrum Computer Centres have no connection whatsoever with the ZX-Spectrum Computer manufactured by Sinclair Research Ltd.

spectrum

A few examples from our

SOFTWARE Selection
from independent software houses

THORN EMI

Software for ATARI	Inc. VAT
Submarine Commander	£34.44
Jumbo Jet Pilot	£34.44
Soccer	£29.84
Kickback	£29.84
Home Financial Management	£19.49
Darts	£19.49
Snooker & Billiards	£19.49
Pool	£19.49
Cribbage & Dominoes	£19.49
Cupute 4 & Reversi	£14.89
Mutant Herd	£24.25
Software for Commodore	
River Rescue	£25.24
Vic Music Composer	£25.24

GEM

Software for ZX81, Dragon and Spectrum	Inc. VAT
Monster Mine (for ZX81)	£4.95
Monster Mine (for Spectrum)	4.95
Monster Mine (for Dragon)	7.95
Space Mission (for ZX81)	£4.95
Space Mission (for Spectrum)	£4.95
Space Mission (for Dragon)	£7.95
Dragon Golf	£7.95
Dragon Character Generator	£9.95

SALAMANDER

Games for Dragon 32	Inc. VAT
Dragon Trek	£9.95
Wizard War	£7.95
Vulcan 0	£7.95
Games Compendium DI	£7.95
Golf	£7.95

RABBIT

Software for Commodore VIC20	Inc. VAT
Space Storm	£6.99
Ski Run	£4.99
Dune Buggy	£4.99
Super Worm	£4.99
Jungle	£4.99
Cosmic Battle	£4.99
Frogger(3K)	£4.99
Rabbit Functions	£4.99
Code Breaker	£4.99
Night Fight (3K)	£4.99
Rabbit Writer (16K Cassette)	£19.99
Rabbit Base (16K Cassette)	£14.99
Myriad (3K)	£9.99
Charset/20 (3K)	£4.99
Skramble	£9.99
Space Phreeks	£9.99
Night Crawler	£9.49
Hopper	£9.99
Tank War	£7.99

KUMA

Software for Sharp	
Electron 22622	£9.20
Cribbage	£12.08
Adventure	£12.08
Chess	£16.68

AUDIOGENIC

Programs for VIC-20	Inc.VAT
Amok	£6.95
Alien Blitz	£7.95
Golf	£7.95
Spiders of Mars	£19.95
Sattelite & Meteorites	£19.95
Bonzo	£7.95
Trashman	£19.95
Boss	£14.95
Tank Attack	£19.95
Word Craft	
Word Processing package	£125.00

Plus many more at your local SPECTRUM dealer -call in now and see!

ACCESSORIES

SANYO Colour Monitor
CDD3125N
£228.85



SANYO	Inc. VAT
SANYO 12" green monitor	£90.85
Slim 3G Cassette Recorder	£29.95
C12 Cassettes	£0.50
Single sided double density disks (Box of 10)	£21.25
Double sided, double density disks (Box of 10)	£33.81
Disk head cleaner	£16.10

Single part 11" x9½" printer paper, box of 2,000 sheets	£13.05
VIC Accessories from Viscount	
Motherboard without Buffer	£24.95
Motherboard with Buffer	£29.90
16K RAM Pack	£43.95
32K RAM Pack	£66.95
64K RAM Pack	£114.94
Currah ChatterboxVoice Synthesiser	£57.45

Now with 48K RAM and still at the same LOW price!

ATARI 800

Now this proven and tested machine has been upgraded to a massive **48K RAM** and its still at the amazing **LOW** price of **£399.99** from **SPECTRUM.** It's an ideal Home Micro for graphics, educational and personal finance etc. use it and it will take you from learning up to a small business use. You can add printers, program recorders, disk drives and more, to expand your micro as and when you want, to suit your needs. So if you're looking for a top of the line micro you must see the **ATARI 800 with 48K at SPECTRUM - NOW!**



Spectrum Price

£399.99 INC. V.A.T.

SPECTRUM FACTS

Maximum user RAM	37,899 Bytes
Text Screen	24 × 40
High Resolution	320 × 192
Cassette Lead	Needs own Recorder

ATARI 400

16K RAM



NOW ONLY £159.95 INC. VAT

BASIC cartridge extra
£39.99 inc. VAT
(£34.77 ex. VAT)

SPECTRUM FACTS

Maximum user RAM (with basic Cartridge)	13,323 Bytes
Text Screen	24 × 40
High Resolution	320 × 192
Cassette Lead	Needs own Recorder

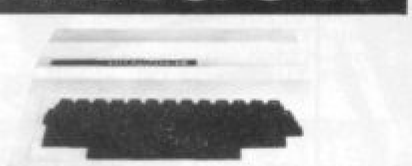
ATARI DISK DRIVE £299.00 INC. VAT

ACCESSORIES, BOOKS & GAMES for ATARI

Accessories	INC VAT
Thermal Printer	£198.95
16K RAM Pack	£65.00
400 Keyboard	£59.95
32K RAM board (400/800)	£75.00
48K RAM board (400/800)	£99.00
Paddles (Pair)	£13.99
Joysticks (Pair)	£13.99
I/O Cable	£12.99
Printer Cable	£28.50
Monitor Cable	£25.00
Thermal Paper	£4.00
Pointmaster Joysticks	£14.95
Quickshot Joysticks	£14.95
Keyboard for Atari 400	£00.00
Books & Manuals	
Wiley Manual	No VAT
Basic Reference Manual	No VAT
DOS. 2 Manual	No VAT
Operating System Listing	No VAT
DOS. Utilities Listing	No VAT
Home Computer Programs – Home/Office	
Word Processor (Disk)	£99.99
Mortgage & Loan	£14.99
Microsoft Basic (Diskette)	£59.99
Home Study (Cassette except where stated)	
INV. to programming 1	£19.99
INV. to programming 2	£22.99
INV. to programming 3	£22.99
Conversational French	£39.99
Conversational German	£39.99
Conversational Italian	£39.99
Conversational Spanish	£39.99

	INC VAT
European Countries & Caps	£14.99
Hangman	£14.99
Kingdom	£14.99
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SPECTRUM FACTS

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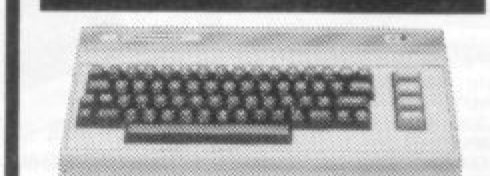
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GAMES NEWS

DISCOVER THE HIDDEN KEY TO TREASURE

PHAROAH'S TOMB

Travel back in time to ancient Egypt and explore Pharaoh's Tomb. This is the opportunity afforded to Vic owners in the latest game from Anirog Computers.

In order to get into the inner chamber of the tomb you will need to find the four hidden parts of the key. To assist you in your travels you will also have to collect other items such as an axe, a spade, and apple, and a lamp.

Pharaoh's Tomb runs on the 16k machine and is available from Surrey based Anirog at £6.00.

Two other new games from Anirog this month for the Vic 20 are a version of the arcade game Donkey Kong called Krazy Kong, and a space shoot out — Xenoll — both requiring a 16k expansion and both will sell at the slightly dearer price of £7.90.

HUNT THE WIZARD'S TREASURE

KNIGHT'S QUEST

The Knight's Quest is to find Merlin's treasure and take it safely back to the castle.

This part text and part graphic adventure divides the screen in two with a screen for pictures in the top half and scrolling text in the bottom.

In order to find Merlin's gold ingots, jewels, Magic Ring and Seeing Mask you will have to explore 120 rooms.

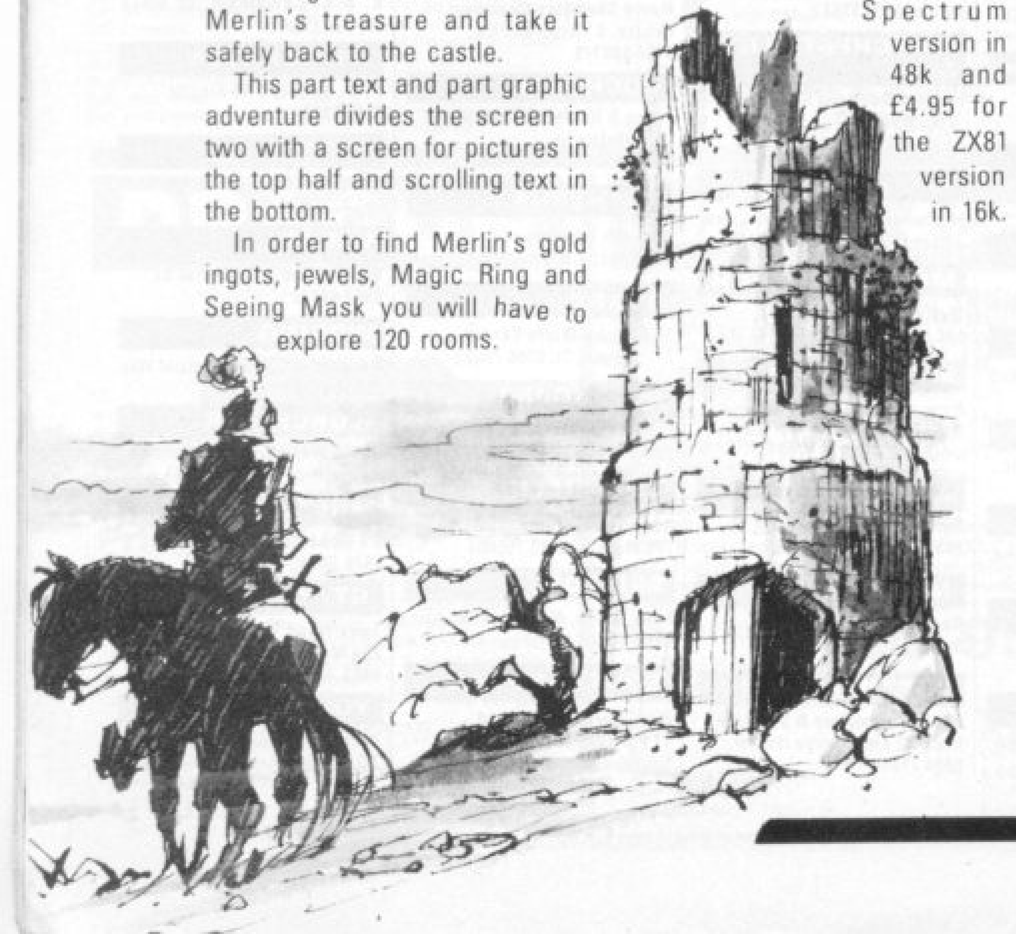


On your journey you will have to battle elves, scorpions and dragons, rescue a beautiful princess from the Wizard of Trill, visit the Witches' Tower and the Valley of the Seven Rocks, and journey underground into secret chambers, which can fill with water and drown you.

The game also features a reincarnation routine which can be useful if you get on the wrong end of an elves spear or a Wizard's spell.

Also useful is a Save fund which enables you to stop the game at a certain point and take up where you left off a few hours or days later.

The Knight's Quest is available from Surrey-based Phipp's Associates at £5.95 for the Spectrum version in 48k and £4.95 for the ZX81 version in 16k.



THE DEMONS INVADE ENGLAND

DEMON ATTACK

America's top selling video game of 1982 is now available in home computer format in the UK.

Imagic's Demon Attack, the shoot 'em up game with no less than 84 waves of exquisitely drawn aliens has been converted for use on the Atari 400/800 and the Vic-20.

The game has been so popular in the US that its designer, Rob Fulop, recently received the award of designer of the year.

The game is imported into the UK by Hales of Yorkshire and costs £29.08. The Atari version is available now and the Vic 20 version will be in the shops in June.

Another well known Imagic video game — Atlantis, an undersea battle — is also in the process of conversion for the Vic and the Atari home computers.

The next large video games manufacturer to follow in Imagic's footsteps is likely to be Parker Brothers of Empire Strikes Back and Frogger fame who have lined up some of their games for a July launch on home computers.

MY, WHAT A NICE GAME YOU'VE GOT

WOLF TRACKS

A villainous wolf haunts the wood in a new computer game idea based around the fairy tale, Little Red Riding Hood.

The game is unique to the Colour Genie computer and welds the elements of the children's story into a tactical game which Genie manufacturers, Lowe Computers, hope will have several spin-offs.

The first version, Wolf Tracks, features Little Red Riding Hood picking primroses in the wood and gradually filling her basket, unaware of the lurking wolf. She must avoid spilling primroses and bumping into trees and the poor girl is occasionally dive-bombed by aggressive birds.

When a basket is filled it should be taken to granny's house and the primroses used to fill vases on the windowsills of the cottage.

The real danger in the wood is the wolf. He leaves his tracks in a trail of red primroses which our heroine crosses at her peril as the wolf will attack her if she does.

The games also features a woodcutter, who can be called upon to bring his hatchet and try to destroy the wolf. But as time marches on in the wood the march of the red primroses continues leaving even more of the screen unpassable.

The Genie's analogue to digital joystick, which increases the player's speed, the further it is pushed in any direction, plays an important part in Wolf Tracks.

It will retail at around £5-6 although a final price had not been decided on as we went to press. The game is available through the Colour Genie Users Club at 46 Highbury Avenue, Bullwell, Nottinghamshire or through Lowe themselves in Matlock.

Other versions of the game are currently being planned.

HORRORS FROM THE HEAVENS!

TERROR-DAKTIL

As the sun sets your blood runs cold as an unspeakable horror pours out of the heavens. Swooping monsters after your flesh. Bird-like and scaly. Creatures not of this world.

Armed only with a battered pistol you will need all your skill as marksman as night falls. Darkness follows shortly but still the monsters come. Their eyes shining out brightly like distant twinkling stars.

Terror-Daktil 4D is the lastest 48k game from Melbourne House software — the people who brought you the Hobbit and Penetrator.

The games fourth dimension mentioned in the title refers to the fourth dimension of time which is incorporated in the game in the shape of the setting sun. The game is available from W. H. Smith at £6.95.

GAMES NEWS

GET ALL TIED UP IN KNOTS

KNOT 3D

The Games News team was managed to sneak a preview of the latest game from New Generation Software — the one man software house of 3D Tunnel fame.

Called Knot 3D the game offers a totally original scenario. An X is positioned at the centre of the screen and appears to move into the screen as walls and shapes loom in front of you.

In the words of the game's designer, Malcolm Evans, the idea of the game, "is to avoid collisions with your own green/yellow trail, and those of up to four chasers, as you rush through an empty three dimensional space.

As more trails are laid it becomes increasingly difficult to thread your way through the knots created".

The game will be available at W. H. Smith at the end of June.

It will run on the Sinclair Spectrum in 16 or 48k and will sell for £5.95.

CALLING ALL VORCON WARRIORS!

VORCON WARS

Here's a game which reflects your personality in the way you play it.

The planet Vorcon is open for plunder. Ruthless people will risk all in an attempted attack on Vorcon. More cautious players will cultivate land to feed their people or spend their resources on drilling for oil.

Vorcon Wars is a brand new play by mail game. The ultimate aim it to become a nuclear power. Towards this end you will have to plan projects such as the construction and launch of a satellite for surveillance and to aid in the transportation of men.

Vorcon Wars is the invention of John Nicholson of Bracknell, Berkshire. Each turn costs £1 plus a further £1.50 for the first three maps and the book of rules.

The *C&VG* Games News team have entered Vorcon Wars and will be keeping you up to date on happenings on the planet.

Each player receives from the organiser two computer printouts. The first of these show the immediate territory around your home base. The various land uses are represented by hexagons, i.e. industrial, agricultural, weaponry.

The second printout gives you a detailed printout of how your resources were used in the previous go with your current status in all areas.

TREASURE HUNT FOR A CHAMPION

ROMIK CHALLENGE

Big cash prizes are being offered by Romik software to players who achieve good high scores while playing some of their new games.

The offer is part of the firm's search for a world champion Romik games player.

Each new cassette contains a yellow entry form for the Grand Master competition. As well as the cash star prize the winner will receive one copy of each new Romik game for one year.

New games this month from the Slough-based firm are Time Destroyers — a scrolling shoot up with a variety of aliens to be blasted. Destroyers is Romik's second space game for the expanded Vic and required 3, 8, or 16k Ram expansion.

Unexpanded Vic owners have also been included in this months new release — Space Fortress is based on the popular arcade game — Phoenix. Powerblaster is a maze chase game with a shoot 'em up space theme.

Romik have also branched out into two other computers with the launch of their first game for the ZX81 and the BBC machine.

Super Nine is a selection of nine games on one cassette for the 1k ZX81. BBC owners are given Birds of Prey — a shoot up with bird-like aliens.

Romik's Vic games are available from Lasky's and other computer shops at £9.99. Prices have yet to be confirmed on the BBC and ZX81 games.

THE CHICKENS COME HOME TO ROOST!

CHICKEN

What goes cluck, cluck splat? A chicken trying to get across a busy motorway of course!

If you want the chicken to survive then you'll need considerable skill and the latest cassette from the new Vic-20 software house Micro Antics.

Chicken Challenge is based on the arcade game Frogger. You must get five chickens safely across the road in as short a time as possible.

Just one thing you should know. This is no ordinary motorway. Along with the lorries and cars you will also see Diving Ducks, and chicken pies on the conveyor belts, and a thieving fox.

Also new from Micro Antics this month is a childrens game. The game is Called Brain Panic and, like Chicken Challenge, is for the unexpanded Vic. In it you have to match up trains, animals and other objects. Brain Panic is based on a childrens card game.

Both games are available now from Micro Antics of Staffordshire at £5.90.

TALK ME THROUGH THIS ONE!

PARSEC

"Good shot pilot" croons the female voice of your ships battle computer as you hurtle through space, guarding your eyes from the blinding flashes of light as your laser fire blasts the aliens.

Two light years further and she speaks again, "Time to refuel". This is a tricky exercise as you must fly your craft through a narrow tunnel. But take heart. Your electronic companion is quick to congratulate you if you successfully complete the exercise.

Parsec is one of two new games from Texas Instruments for the TI 99/4a incorporating their add-on speech synthesiser.

You are at the controls of a space ship scrolling from left to right against a background of stars. But don't let your one directional movement lead you into the mistaken belief that the aliens will conveniently attack from one direction as well. They won't. They will come at you from behind as well as from the front.

There are sixteen different types of aliens to be destroyed — all capable of unique attack strategies.

The second new talking game is called Alpiner and features a far wider vocabulary than Parsec.

You play the part of the intrepid mountaineer, bravely clambering over the slippery slopes, falling boulders, battling snakes, avoiding fires, and even an eagle which attempts to bomb you with a giant golden egg.

Your commentator is always ready with a cutting remark when you make a false move. "Did you mean to do that?" she sarcastically enquired when I tumbled to the ground after being hit by a falling boulder.

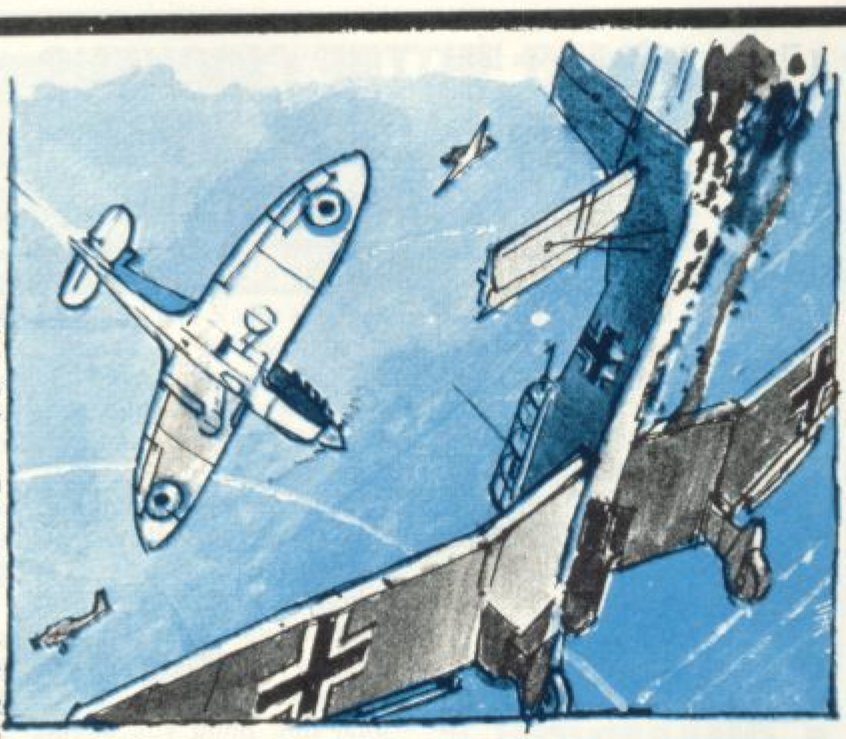
It is difficult to resist making mistakes on purpose in Alpiner just to see what will be said next!

Alpiner and Parsec are available from your Texas dealer now at £31.95. The speech synthesiser is available at £49.95.



Illustrations: Jon Davis

GAMES NEWS



BACK TO THE BATTLE OF BRITAIN

SKYHAWK

The scene is a sleepy village set among the hills in the heart of the English countryside. The date is 1943 — the height of World War II and the Battle of Britain.

Suddenly, the tranquility of a hot summer day is broken by the roar of German aircraft engines flying in low to dodge coastal radar.

The lives of many people depend on you — a lone fighter pilot facing a squadron of enemy aircraft. This latest game from Quicksilva, called Skyhawk, for the Vic-20 puts you in the hot-seat — defending your homeland from a deadly attack. Keep a careful eye on your fuel supply. You may have to land to refuel during the battle.

Skyhawk runs on the Vic with 3k or 8k expansion and is the second game from Quicksilva for the Vic. It is available now from the Southampton-based firm at £7.95.

Spectrum owners have not been left out of this month's new releases with two new arcade style games.

Astroblaster is a multi-wave shoot 'em up with an assortment of tough aliens. Frenzy is a robot attack game in which you must fight it out with deadly droids. Both games run on 16k or 48k machines and are available from HQ at £4.95 each.

STOCKS AND SHARES ON THE MARKET

STOCK EXCHANGE

New software house A.S.L. are understandably bullish about their new game for the Oric.

The game is called Stock Exchange and enables you to dabble with stocks and shares for the afternoon without causing your bank manager to burst a blood vessel.

The game displays the continuously updated performances of nine companies. You must buy and sell shares to make money. Borrowing is allowed but not always advisable.

On the B side of Stock Exchange is a bonus program called Etch-a-Sketch which features a movable cursor, shading in any colour which you can select from the list on offer.

Stock Market and Etch-a-Sketch are available from the Wrexham based firm at £4.

THEATRE OF DEATH AND DESTRUCTION

SHEVA

Budding Masterminds reading this will not need to be told that Sheva is the Hindu god of destruction.

The less well informed amongst you may also be interested to learn that Sheva is the name of the latest game from Red Shift Software which simulates the conflict involved in Europe during World War III.

The game features a scrolling map of Europe. The cities which you have chosen at the beginning of the game may be annihilated by nuclear warheads if you are not careful.

Sheva is the follow up to Red Shift's Timelords — a complex computer-cum-boardgame for the BBC model B, at £7.95.

Sheva runs on the 48k Spectrum and is available from the London based Red Shift at around the £7 mark.

TUNE IN TO THOSE NEW MICRO WAVES

RADIO PROGRAMS

Home computer owners in the West Country can now tune into a free bank of software on their local commercial radio station — Radio West.

C&VG spoke to Zorte, real name Edwin Tozer, Radio West's computer program presenter. "The program goes out on Monday evenings between 7.30 and 8.00 pm. We cover computer news, run competitions, and broadcast short computer programs — usually no more than about fifteen seconds in length."

Subjects covered so far have been multiplication, morse code, and a graphics package for the ZX81 which was programmed to draw a picture of a face.

No games have been broadcast as yet but Zorte is working on a Breakout type game for the BBC machine, and soon Radio West will be ready to broadcast their first game.

As well as the short programs broadcast during the programme Radio West also broadcast longer programs after the station has finished normal transmission.

These longer programs have been mainly educational, with some business applications. Machines for which software has so far been broadcast are the Dragon, ZX81, BBC, Epsom, Newbrain, Atari and the Oric.

JACK JUMPS JUST LIKE A FROGGER!

JUMPIN' JACK

Jumpin' Jack Flash he's a gas, gas, gas. Well — more precisely, he's a brand new Frogger type game for the unexpanded Vic-20.

Hopping from log to log, and then on to turtles, you must jump your little green friend across a fast flowing river.

Jumpin Jack is just one of a wide range of games which have just been released for the Vic-20 from Sumlock.

In this months batch is a Galaxians-type game called Triad and a version of Scramble. All three games run on the unexpanded machine and are available at £7.95.

Also new from Sumlock this month for Vic owners is an adventure game requiring a 16k expansion.

Starship Escape challenges you to find the various bits of your spacecraft which have been hidden by aliens in their giant spaceship. Starship is available at £9.95.

THE BIRDS FLY HIGH WITH VIC

FIREBIRDS

Cosmic Firebirds — the arcade game with the spiralling aliens — has at last been converted for the Vic-20.

Firebirds is the latest offering from the new software house — Solar Software.

Other games in the range so far include tried and tested favourites — Galaxians, Scramble, Super Breakout, Gunfight, Asteroids and Munchman.

The games are available from Currys Micro C and direct from Solar Software at £5.95 for Gunfight, Asteroids, and Munchman, and £6.95 for Galaxians, Scramble and Super Breakout.

All of the games run on the unexpanded Vic except Cosmic Firebirds which runs on the Vic with an 8 or 16k expansion.

GAMES NEWS

THE DRAGON SPREADS ITS' WINGS!

FLIGHT SIMULATION

Up, up and away go Dragon owners with a flight simulation written by a professional pilot.

The game challenges you to safely take off and land a small plane. You have all normal flight controls including an instrument landing system and vertical speed indicator.

Flight Simulator runs on a Dragon in 16k and is available from Salamander Software of Brighton at £9.95.

DAMSELS IN DISTRESS NEED HELP!

WIZARD

Wizard takes you back to a fantasy land of spells, demons and beautiful maidens with flowing golden locks.

But if you think this is a fairy tale adventure game you would be wrong. Wizard is an arcade style game with a few original twists of its own.

The demons are attacking your planet — swooping down and abducting the maidens who are helpless against their superior strength.

Your job is to save them before they are brought back to the evil king who will put them to death in a ceremonial sacrifice.

Several waves of demons must be dealt with — together with cunning little bugs who come at you intent on destruction.

Wizard runs on the BBC model B in 32k and is the latest game from Quicksilva at £6.95.

Also new for BBC model B owners is a monster attack game called Protector. The monsters are attacking scientific installations in an isolated part of your planet. The game gets faster and faster as you drive your craft from base to base, blasting the invaders. Watch out also for the occasional monster which grows larger as the game progresses.

The third Beeb offering from Quicksilva this month is a boxed Music Processor which enables you to exploit the musical capabilities of the BBC A or B.

The Music Processor costs £14.95, you get a 30-page instruction manual included in the price.

Quicksilva's original customers — Britain's one million plus ZX81 owners have not been left out of this months new releases.

Four new games are on offer for the 16k machine. Ocean Trader is a seafaring simulation enabling you to play captain of the ship, Pioneer Trail takes you back to the wild west, and Black Star is 3D shoot 'em up. For arcade addicts there are also versions of Amidar, and Pacman.

WORDS OF WISDOM, AND GAMES!

TEXAS BOOK

Texas owners can look forward to 35 new games to enter into their software starved computer when a new book goes on sale later this month.

The Texas Program Book contains 35 listings which you can enter into your machine. The subjects covered include games, home accounts, and a filing system.

Games highlights are 3D-Maze, horse racing, tennis, and a novel game in which you help a penguin to save its eggs.

The book will be available from Phoenix Publishing Associates at £5.95.

THE GAMES CAPITAL OF THE U.K.?

LYVERSOFT

Liverpool is fast becoming the Silicon Valley of the UK for computer games anyway.

The city that gave you Bug Byte and Imagine can now boast a third specialist games software house called Lyversoft.

They have just launched a range of games for the Vic-20. Apple Bug challenges you to gobble up the life saving apples before the bug catches you. Crazy Climber sets you the equally difficult task of climbing scaffolding and catch balloons floating past to score bonus points.

Space Assault is a Scramble-type game with a difference. Instead of bombing fuel-dumps to refuel as in the arcade game you must dock with the fuel-tankers.

Lunar Rescue puts you at the controls of a ship attempting to land on a planet bombarded by a meteor storm. Your task is to pick up the three marooned scientists and make your escape.

The games run on the 3 or 8k Vic-20 and are available from the Liverpool based firm at £5.95.

FIGHT THE FLAB, NOT MORE ALIENS!

DIETRON

Calling all overweight Spectrum owners. If you are becoming flabby and hollow-eyed due to many hours crouched over the keyboard then here is a computerised answer to the problem.

Dietron is a new program designed to enable you to plan your diet.

No, you don't stand on your Spectrum to make it speak your weight. Instead the program asks you a number of questions which "will establish a complete range of values and requirements that are personal to you".

Once your values have been calculated you can jot them down and proceed with your diet, or if you have a printer, make a print-out.

Key 1 to 4 on the Dietron show you the complete range of foods for which information is held. For example key 1 will display information 37 varieties of vegetables.

The values can be reset at any time for a second person to receive information. There is also a second program on the tape which is a data bank of nutritional information. Less chips for Spectrum owners from now on!

Dietron runs on a Spectrum in 48k and is available from W. H. Smith at £5.95.



Illustration: Jon Davis

If you think Pac-Man* is a tough act to follow, meet Ms. Pac-Man*.

Make no mistake, this little lady is a screen sensation.

More dynamic, more talented than even Pac-Man himself (and he's the world's biggest selling video game ever).

Ms. Pac-Man has just what it takes to be a video star.

Graphics that are close to arcade quality. Four mazes to amaze you. She even hands out bonus points for audience participation. So visit your Atari® stockist and meet Ms. Pac-Man in person. She can't wait for you to give her a screen test.



ATARI®

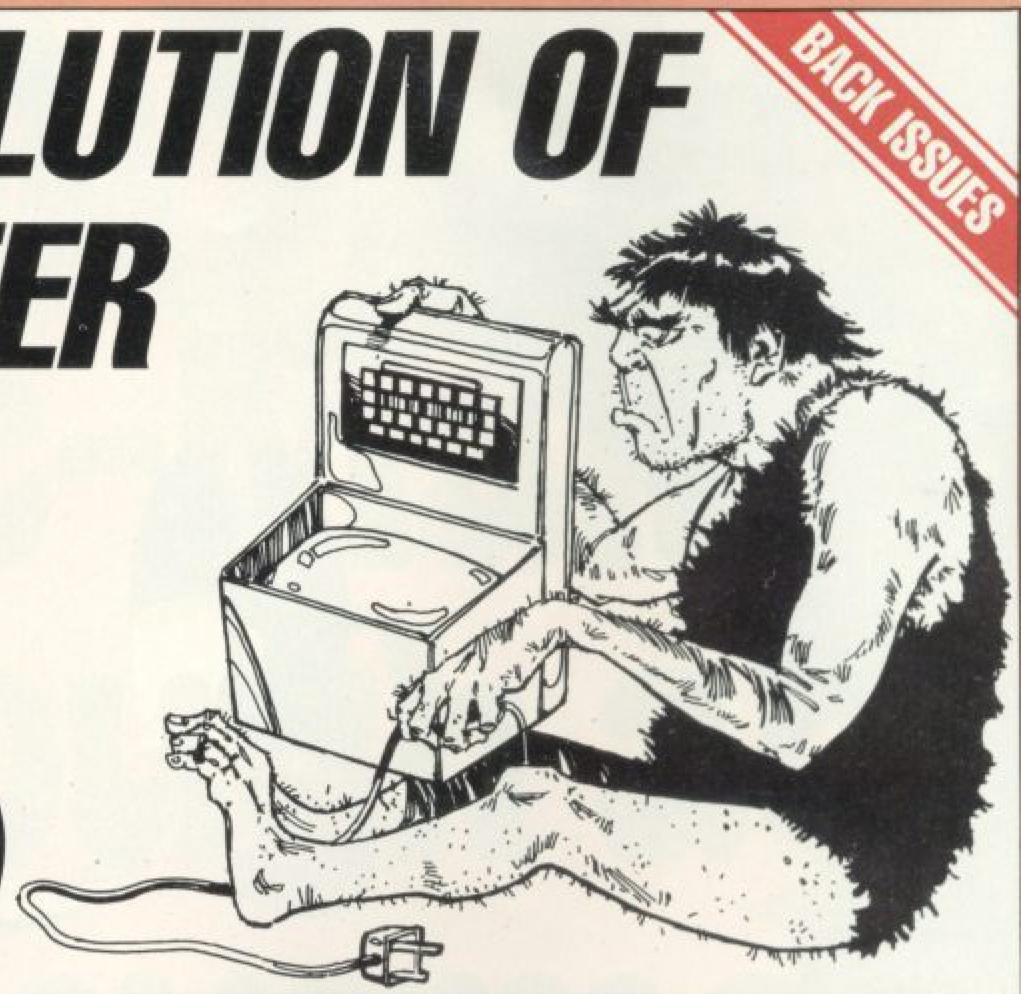
A Warner Communications Company

More fun and games



THE EVOLUTION OF COMPUTER & VIDEO GAMES (PART 1)

BACK ISSUES



Most computer historians agree that the first known remains of Computer & Video Games date from November 1981. It was then that this magazine first emerged (a little unsteadily) into the primeval twilight of the early days of Sinclair Man.

Then huge computer dinosaurs roamed the Earth, thrusting keen young programmers into their wall-to-wall maws and the magazine looked a little out-of-place surviving on a diet of strange new features and listing material washed up from across the Atlantic.

Naturalists are only now beginning to draw conclusions about the close association between the Computer & Video Games story and a little yellow gobbling creature's own evolutionary niche . . .

Let us take a closer look at some of the noteworthy steps in the evolution of both:-

November 1981
The stripling emerges into twilight with Tarot on the Tandy, Musical Hangman on the Sharp MZ-80K, Trench on the Atari, Nibblers on the Pet and Super Nim on the Apple. Keith Campbell kicked off his popular Adventure series, Garry Marshall kicked off graphics with a space invader. There were Pacman arcade tips and Max Bramer looked at the first chess machine, Von Kempelen's Turk.

December 1981
Growing up fast with Potshot on the Vic-20, Breakout on the Atom, 'Round the Horn' on the Tandy, Mini Golf on the Atari and Pet owners could tackle Rubik's Cube with more confidence. Keith Mott went trouble-shooting on the ZX81 in Kit Korner and Screaming Foul-up fell in love with Terry Wogan.

January 1982
A new year begins with Ted Ball on the trail of the Bugs in his Practical Programming column. Speed Race for the Texas, Treasure Hunt was a popular Apple adventure — much converted by owners of other machines, three 1K wonders for the ZX81 and Changing Hearts for Atari owners. We also saw a seamier side to gaming with a feature on Softporn Adventure!

February 1982
Science Fiction author David Langford brought a new look to space games with Space Blockade. Dr Livingstone set up a quest for Sharp owners and Grand Prix gave Tandy owners a racetrack to try out. David Annal POKEd some sounds out of the quieter micros and Arcade Action announced two Pacman lookalikes.

March 1982
Robin Bradbeer reported from Las Vegas on a country going video crazy — how right he was. ZX81 owners got to grips with Reversi (Othello), there was Startrek III.4 for the Tandy and Octodraw had the Atari moving in eight directions at once.

April 1982
Spring came with Tim Metcalfe's feature on pinball, a revitalised sector of the arcades fighting back against Space Invaders. Engineer helped Atari owners rebuild the Golden Gate Bridge, Poker for the ZX81 and Ron Potkin's classic Tandy wargame Kriegspiel. Plus Pacman hit the home Video Screens at last.

May 1982
Computer Moderated Games were investigated by Terry Pratt (the first thoughts on Seventh Empire were voiced about here). Minotaur took the Vic-20 down into a maze and tried to lose it, Pacman arrived in a C&VG listing on a Pet, Minopoly for up to five Sharp businessmen, Meteorstorm took Apple owners by surprise and Earthport II won Tandy fans.

June 1982
The World Cup was upon us and we responded with World Cup Manager — written for the Sharp but without a PEEK or POKE and since converted to many a micro. Vic-20 owners were set afloat on a river torrent in Speedboat, there was Trolls Gold on the Apple and Dog Star Adventure on the Tandy. It also included issue 1 of our BBC Micro publication, Owl.

July 1982
Do the arcades have anything to offer the fairer sex? America was wooing women with Ms Pacman and we featured this first lady of the arcades in July. Imhotep took the Apple owners back to ancient Egypt, Moon Shuttle sent the Vic into space and Z-Xtra gave 16 pages over to Sinclair fans.

August 1982
Haunted House gave Atoms a shudder, Space Hopper made Tandy's jump to it and Rocks made Vic owners roll over and beg for more. Imagic launched a range of cartridges for the Atari VCS. Hardcore was given over to a game-player's guide to the Atari and Sue Garden gave us all a giggle with a computer widow's tale.

September 1982
Tron: out of the arcades came Walt Disney's graphically stirring film about being trapped in a computer game. We featured it first. Pacman appeared on the Vic-20, there was Star Wars on the Atom and Colditz Adventure on the Tandy. Issue two of Owl gave BBC owners Speed Trial and X marks the Spot.

October 1982
C&VG saw out its first 12 issues with Space Watch on the Spectrum, asking you to befriend the aliens before it's too late! Sharp Defender, Galaxian Colony II on the Apple and the controversial Wild Strawberries on the Atari added to the action. And Pacman appeared in the Bugs cartoon!

Back issue enquiries to: Competition House, Farmdon Road, Market Harborough, Leicestershire. All orders should include the appropriate remittance made payable to Computer and Video Games.


MAL FUNCTION
T. HITCH
SNAG JNR
SCREAMING FOUL UP
THE BUGS
R.A.M
THE BUGS ARE ENTERING THEIR NEW MICRO ...
YOU MAY ONLY ENTER IF YOU PROMISE NOT TO CORRUPT, PERVERT OR IMPAIR ANY PROGRAMS FOUND WITHIN
AHEM! WE PROMISE!
RAM
BEING A USER FRIENDLY BUG IS HARD WORK. LOOK, THE POOR DEVIL IS TRYING TO WORK OUT IF HE CAN GO ON HOLIDAY THIS YEAR!
OH NO! HIS AUNT MAISIE'S ON THE LIST AGAIN!
1 BOGNOR--- 5 DAYS.
2 COMPUTER CLUB TRIP.. SINCLAIR'S WEEKEND.
3 AUNT MAISIE 3 WEEKS
4 HANG GLIDING IN NEASDEN 2 DAYS.
YES! IT WAS AN AWFUL PROGRAM. BUT WE KNOCKED IT INTO SHAPE FOR HIM. IT WORKS OUT TRAVEL COSTS, SUBSISTENCE, TOUR COSTS. TAKES INTO ACCOUNT HIS SALARY AND OF COURSE. THE FUN FACTOR!
AUNT MAISIE'S IS AWFUL. HER VOICE, HER POLISHING AND DUSTING NEARLY ASPHYXIATED US!
SHE CAN'T BE THAT BAD. I'LL GET GRAPHIC MODE TO DRAW HER UP!
TAD! TAD!
YUK! THAT'S HER. I REMEMBER SHE SPILT PORRIDGE ON US!
SOB! PLEASE ALTER THE PROGRAM. WE CAN'T GO BACK THERE!
B.B. BUT- THAT WOULD BE TAMPERING!
YOU'VE GOT TO DO SOMETHING. THE PROGRAM IS BOUND TO COME UP WITH AUNT MAISIE'S -- SHE'S SO CHEAP!
I CAN'T IT'S DEAD AGAINST THE USER FRIENDLY CHARTER FOR BUGS! RULE 7. SECTION 8.
A FEW MOMENTS LATER..
HANG GLIDING IN NEASDEN ... GREAT! I NEVER THOUGHT I COULD AFFORD IT!
HEE! HEE!
CHEERS!

GO GO GO

BY ALLAN SCARFF

Go is far more popular in Japan than any comparable game is in the West. Apart from appearing on peak time television, Go is the subject of regular newspaper columns and the national press spend quite large sums of money on sponsoring professional Go tournaments.

In Japan, Tsume-Go takes the place of the daily newspaper crossword puzzle. This type of life and death Go problem can be extremely tricky to solve even though there may be very few moves to consider.

The example shown in figure 1 is about as simple as they come. Black's first move is almost certainly at A3, B3, A4 or B4, but which?

The object is to stop white forming two eyes. If, for instance, white manages to play both at A3 and B3, white's stones can never be reduced to a single liberty and therefore can never be captured.

Figure 2 shows black's most obvious approach which of course fails!

If you wish to get the full flavour of Tsume-Go try to solve the problem without looking at figures 4 and 5. Even though there are only a few possibilities you may soon find that it becomes increasingly difficult to remember which sequences of moves you have already considered and thus what possibilities are left.

This is one element of Go in which the computer can shine. Since the position is entirely isolated, there are no complex interactions to complicate matters. The simple technique of tree-searching will suffice.

Figure 3 shows a small part of the tree of possible sequences. After each move the white stones must be examined for one of three states:

- Dead — there are no longer two or more potential eyes
- Alive — there are two or more completely formed eyes
- Maybe either — there are still potentially two eyes not yet fully formed.

In the last case the next move in the sequence must be tried. In the other two cases alternative moves must be examined.

The listing shown gives the main logic needed to search the tree.

We need only consider the intersections within the enclosing black stones. The x and y co-ordinates of these points must be placed in the tryx and tryy arrays prior to calling the tsume procedure. The routine finishes with the result, the first black move, available via the number 1 element of the branch array.

For a problem of this size the procedure will examine about 200 sequences averaging under 5 moves each. Since the status of the white stones must be examined after each move, the whole process will take many seconds if not minutes.

Larger, more typical problems can take much longer. It may be possible to speed the search up by eliminating some of the sillier moves, but too heavy pruning of the tree can mean rejecting a move that may look silly but is actually the only move that works!

Now if you've attempted the example (without the aid of a computer), you may appreciate the worth of a thorough Tsume-Go program even if you have to leave it running all night!

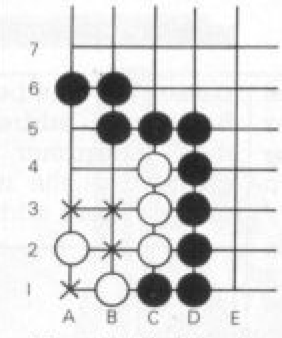


Figure 1: Black to play and kill white (crosses mark potential eyes)

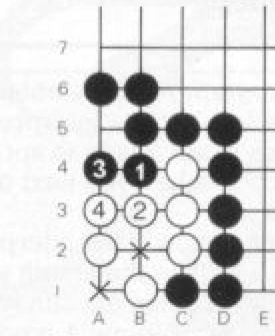


Figure 2: The obvious failure (two eyes are alive)

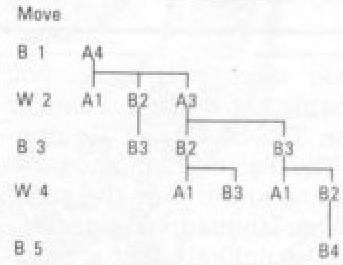


Figure 3: A small portion of the tree.

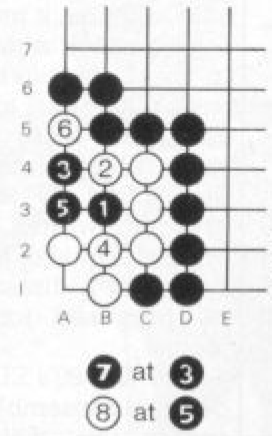


Figure 4: A less obvious failure. (The second eye is achieved after capture of three black stones).

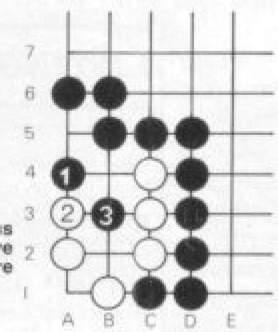


Figure 5: Success! (If white next plays at B4 black captures at B2).

```
1000 REM BBC BASIC
1010 REM TSUME PROCEDURE
1020 REM tryx and try y must already hold coordinates
1030 REM branch array must already be defined
1040 REM Decision Table:
1050 REM                    | WHITE MOVE      | BLACK MOVE
1060 REM-------------------|-----------------|---------------
1070 REM                    |                 |
1080 REM dead               | next selection  | up 1 branch
1090 REM alive              | up 1 branch     | not applicable
1100 REM maybe              | down 1 branch   | down 1 branch
1110 REM branch exhausted   | up 2 branches   | up 2 branches
1120 REM-----------------------------------------------------
1130 REM
1140 DEF PROCtsume(limit)
1150 move=1 : branch(1)=1 : REM initialise
1160 IF move > 0  select=branch(move) : PROCredomoves(move)
1170 IF move < 1  ENDPROC
1180 REPEAT
1190     legal=FUNCplaymove(tryx(select),tryy(select))
1200     select=select+1
1210 UNTIL  legal OR select=limit
1220 IF NOT legal  move=move-2 : GOTO 1160 : REM up 2 branches
1230 REM legal:-
1240     PROCtestlife
1250     IF maybe  move=move+1 : select=1 : GOTO 1180 : REM down
1260     IF (dead) AND (moveMOD2=0)  GOTO 1180 : REM across
1270 REM all other legal cases:-
1280     move=move-1 : GOTO 1160 : REM up 1 branch
1290 REM
1300 REM This routine is written for simplicity! For space saving
1310 REM use byte arrays accessed via indirection operators. For
1320 REM elegance use block structure (no GOTO's) with recursion
1340 REM (the routine calling itself).
```

There is still only a limited library of games software for the Dragon owner. And many have looked longingly at the wealth of Tandy Colour Computer software and wished the two machines were closer than the hair's breath which separates them.

Now they are. RON POTKIN has taken time off from his Warpath series to show Dragon owners how they can make use of Colour Computer software on their brand new machines.

DRAGON N
FROM TH

If you own a Dragon, you probably know that it is similar to the TRS-80 Colour Computer, The Basic commands are the same and it uses the same machine language. Yet despite this, it is unlikely that a program written for the TRS-80 will run satisfactorily on the Dragon. In this article, I intend to give some help in converting the programs so that they will run.

Unfortunately the PLAY command still defies translation, but I never use it anyway.

Unfortunately, little can be done to ROM packs. The design is such that they cannot be easily be altered to run on the Dragon. We can however, adjust Basic programs. Machine language programs (those which are run using the EXEC command) can also be altered but this can be very difficult. More about this later.

First, let us examine the Basic Interpreter Program. You will know that when you switch on the computer, it wakes up and prints "OK" on the screen. In that fraction of a second an initialisation program, a part of the Basic Interpreter, has been automatically run in order that the computer may be ready to accept and carry out your commands.

This is similar to a calculator which is able to add, subtract, multiply and so on immediately you turn it on.

It is a complex program. There are routines to print on the screen, read the keys you press at the keyboard, draw a line, read the tape and many more. Many programmers when writing in machine lan-

TIME AND SPACE

guage will use these routines in their programs.

It saves time and space and avoids re-inventing the wheel, but it is one of the main reasons for our conversion problem. You must know where these routines lie in memory and the addresses may be different in the two machines.

The Basic Interpreter cannot be erased or changed. When you switch the computer off, any program you have entered will be lost but the Interpreter remains intact, ready to spring into action when you next turn it on.

One function of the Interpreter is to reduce the length of a Basic line. Let me explain what this means. Assume I type in the following line:
10PMODE 4,1 : PCLS : SCREEN 1,0

LISTING GARBAGE

Ignoring the line number and spaces, this has 23 characters but to save space the commands PMODE, PCLS and SCREEN are converted to numbers (or tokens) so that instead of 23 characters only 11 are required to hold the line in memory.

These tokens are not the same in both machines. As a result, if you load a TRS-80 program in this compressed format into the Dragon, the instructions will be mis-read. When you list the program, you may believe that you are listing "garbage", but closer inspection will show that although the Basic commands are different the line numbers and variable are intact.

It is usual to save the program on tape in compressed format because it reduces loading time, but you do have the option of saving in ASCII format. The command is:
CSAVE "PROGRAM",A

Saved this way, the words PMODE, PCLS and SCREEN will be saved instead of the tokens. If you save a program on tape in the ASCII format using the TRS-80, you will be able to load it correctly into the Dragon. The Dragon will read the commands and translate them into its own tokens. Try this method if you have access to a TRS-80.

Although we can change the tokens, there is one instruction which may cause difficulties. This is the USR function which is used to access a machine language program from Basic. It is mentioned only very briefly in the Dragon manual.

If Basic passes a number to the program or the program passes a number back to Basic, two addresses within the Interpreter must be changed in the machine language. These addresses are:

	TRS-80 Decimal	TRS-80 Hex	Dragon Decimal	Dragon Hex
Get argument from Basic	46061	B3ED	35632	8B30
Return result to Basic	46324	B4F4	35895	8C37

In addition, it may be necessary to check whether routines in the Interpreter have been used. This starts to get complicated and there are no easy rules. You will soon discover that trying to understand a program written in machine code is a challenge. If you are keen, get a disassembler and be prepared for some late nights!

The TRS-80's EDTASM has a good disassembler but you cannot use the tape commands. If you find this difficult to follow, don't worry; your understanding will improve as you become more accustomed to your Dragon. Just remember that if you do not think you can convert a TRS-80 program, don't waste your money!

Now let's see how the program can help. It's purpose is to create a machine language program which will convert the TRS-80 Basic tokens to the equivalent for the Dragon. It will leave unchanged anything contained within strings, so that any machine language routines or graphics will be safe. The program syntax is not checked.

All lines within the TRS-80 program containing USR will

LOADER FOR DRAGON CONVERTER

```
10 CLEAR100,29999
30 DATA  80,81,82,83,84,85,86,87
,88,89,8A,8B,8C,8D,8F,90
40 DATA  91,92,93,94,95,96,97,99
,9A,9B,9C,9D,9E,9F,A0,A1
50 DATA  A2,A3,A4,A5,BB,BC,BD,BF
,C0,C1,C2,C3,C4,C5,C6,C7
60 DATA  C8,C9,CA,CB,CC,A6,A7,A8
,A9,98,8E,AA,AB,AC,AD,AE
70 DATA  AF,B0,B1,B2,B3,B4,B5,B6
,B7,B8,B9,BA,BE,CD,80,81
80 DATA  82,A1,84,88,8C,8D,8E,8F
,90,91,92,93,96,97,98,99
90 DATA  9A,9B,8B,89,8A,87,94,86
,83,85,95,9C,9D,9E,9F,A0
100 DATA 00,01,A4,BE,00,19,7F,7D
,70,10,AE,81,34,20,10,AE
110 DATA 81,10,BF,7D,71,A6,84,81
,22,26,0A,C6,01,F0,7D,70
120 DATA F7,7D,70,20,44,81,00,27
,44,F6,7D,70,C1,00,26,39
130 DATA 81,FF,26,27,30,01,E6,84
,C1,80,25,2D,C0,80,10,8E
140 DATA 7D,4E,E6,A5,E7,84,C1,A1
,26,1F,B6,7D,ED,AD,9F,A0
150 DATA 02,8D,35,86,20,AD,9F,A0
,02,20,0E,81,80,25,0A,80
160 DATA 80,10,8E,7D,00,A6,A6,A7
,84,30,01,20,A8,30,01,A6
170 DATA 84,81,00,27,05,35,10,16
,FF,8C,35,10,39,55,27,10
180 DATA 03,E8,00,64,00,0A,00,01
,34,16,FC,7D,71,8E,7D,EE
190 DATA 8D,1D,8D,2A,30,02,8D,17
,8D,24,30,02,8D,11,8D,1E
200 DATA 30,02,8D,0B,8D,18,30,02
,8D,05,8D,12,35,16,39,10
210 DATA 8E,00,00,A3,84,25,04,31
,21,20,F8,E3,84,39,34,16
220 DATA 1F,20,1F,98,8B,30,AD,9F
,A0,02,35,16,39
230 DATA XX
290 U=32000
292 CT=0
300 READA$:IFA$="XX"THEN500
310 POKEU,VAL("&H"+A$)
315 CT=CT+VAL("&H"+A$)
320 U=U+1
330 GOTO300
500 IFCT<>36454 OR U<>32317 THEN
PRINT"ERROR- CHECK THE DATA!":EN
D
510 PRINT"MACHINE CODE LOADED AT
 32000"
520 PRINT"MOTOR IS ON":MOTORON
530 PRINT"READY RECORDER AND PRE
SS ENTER"
550 INPUTQ$:MOTOROFF
555 FORI=1TO4
560 CSAVEM"DRAGON",32000,32316,3
2115
565 FORJ=1TO2000:NEXTJ,I
570 PRINT"OK - EXECUTION ADDRESS
 IS 32115"
580 END
```

NEW GAMES THE TANDY

be printed. If none is printed the converted program should run correctly. Otherwise, you will have to assess the difficulties bearing in mind the explanation above.

PREPARING THE PROGRAM
1. Type in the program below and save it on a new tape i.e. CSAVE "DRAGCONV"
2. Now type "RUN". The program will build up the machine language program.
3. There are two checks to ensure that the DATA has been entered correctly. If the number of items is not 316 or they do not sum to 36454, an error message will be printed. If this occurs inspect the DATA very carefully.
4. If the program passes the tests, you will be asked to get the cassette recorder ready. Put a second new tape into the recorder and press the RECORD and PLAY. Press ENTER when ready. Don't use the same tape — things can get very difficult if you want to erase one program and not the other.
5. The converter will save in machine format. The name of the program is "DRAGON". Four copies are saved.

OPERATION
1. Switch on the Dragon and type "CLEAR 200,31999". This will keep the routine safe.
2. Rewind the tape containing the machine program and load it i.e. CLOADM "DRAGON".
3. Now load the TRS-80 program written in Basic.
4. Type "EXEC 32115".
5. The program will print out line numbers of any USR's.
6. When conversion is complete, LIST the program. It should now make sense.
7. CSAVE the converted program on a new tape.
8. Do not RUN it if you have further programs to convert since programs using protected memory are liable to ruin the converter.
9. Check the programs and the USR's once all conversions are complete.

By the way, the program does not work in reverse! You cannot convert a Dragon program back to the TRS-80.



Illustration: Dorian Cross



LEARN THE PHAROAH'S SECRETS

TIPS ON TUTANKHAM

Tutankham has a natural appeal to the watcher but it is a confusing game for the beginner as he struggles to find his way through the maze of tunnels to the legendary treasure of the tombs.

It's a maze game with a difference as you can't see the whole maze at once, just a collection of rushing bats, snakes and birds, the undead creatures of the pharoah's tomb, whose touch is lethal.

These have to be shot, smart-bombed or dodged as you grab the treasures and keys necessary to progress.

You begin your expedition with two smart bombs and three men and one extra of each arrives every 20,000 points. Smart bombs are shown as lanterns at the top of the screen and clear the whole area you are in at the time.

The first screen takes you up past the enemy's house where monsters issue forth and into a secret tunnel through to the second screen.

The tunnel is only opened by the key which must first be grabbed by the adventurer. 1,000 points are awarded for getting the key and there is a time bonus to be scored by getting it into the lock soon after the start of that screen.

If you run out of time then your fire power vanishes and you have to get to the lock before the enemy get to you.

The second — and all subsequent screens — need two keys for two locks, collected in the order: key, lock, key, lock.

Your fire ability is fast and stabs out both ahead and behind you at the same time. But it is limited, it can't be used in vertical passages. The monsters realise this and rush you in the vertical passages while lurking and waiting in the horizontal ones.

These adversaries often have their little dens situated on main highways through the maze and challenge you to get past.

The maze is set out as underground tunnels with large open spaces, supposedly giving the effect of the passages you might find beneath a pyramid.

The open spaces can be particularly dangerous when the creatures can attack from all sides.

For bonus points pick up the treasures, either a chest or a ring, that are dotted around the screen. The first of these is worth 500 points, the next 1,000, the next 1,500 and so on.

Smart bombs are often best saved for the rush to the last lock, when monster activity is at its height. If in doubt check the radar scanner at the top of the screen.

Getting past a den is a case of waiting until a spurt of monsters dies down and then rushing, guns blazing past.

The snakes and birds are predictable but bats are fast and erratic. If something closes its jaws around you as you approach your run-in to the final treasure, you can usually be sure its one of these.

Our thanks to Carl Warrington of Leicester for the tips.



POINTS FOR CRASHING

BURNING RUBBER

Burning Rubber is the first car race game which encourages you to slam into other road-users.

Simulating the stock car races where the aim is to crunch as many opponents as possible, Burning Rubber gives points for bumping into rivals and sending them spinning from the track.

The danger is that each contact will also send your own car screeching towards the track perimeter, so that you must leave yourself room to control the swerve before hitting the hedge boundary.

Burning Rubber is a racetrack which is looked down on from above, it travels in a straight line scrolling down from the top of the screen.

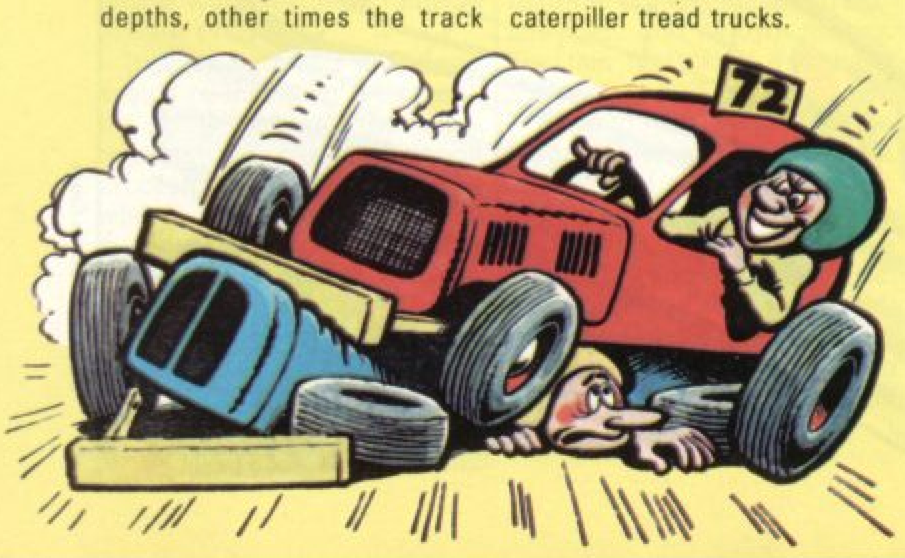
Unfortunately the course seems to be set in a river delta and the track is constantly being interrupted by stretches of water. These sometimes have narrow bridges across their depths, other times the track continues on islands in the centre of the waterways.

Luckily a jump button will lift you out of trouble and actually help boost the score if you can successfully manage to land on an unsuspecting opponent.

The only restriction on jumping is that you must be up to a certain speed before you can take off. That speed is achieved quite easily and then there is nothing to stop you leapfrogging around the track, over opponents, rivers and intruding hedges.

Nothing, that is, except a tendency to slow down drastically when landing on an opponent and a certainty that a watery death awaits anyone landing in the drink.

Other hazards come mainly from your fellow road users. These vary from hole-digging trucks, to almost unmovable caterpiller tread trucks.



SEND YOUR BEST SHOT

Hurry up and send in a top score, if you want to enter our 1983 Video Games Championships.

The grand final takes place at the end of June and we'll need your top score in by June 23rd to make you eligible to win a place at the finals.

A form can be cut out of the magazine on page 11 and taken around to your local pub, club or arcade to fill in the best score you can on your favourite machine.

You can enter on up to three different machines. The prize is a brand new arcade game from Taitel Electronics, one of their new summer releases which will be in the winner's home before it's in the arcades.

And if you make your top score while your magazine is still at home ask the arcade owner if he has an entry form. We are distributing forms to many arcade, pub and college sites.

If you have entered already there's nothing to stop you improving your score in the meantime and sending it in on this month's form but please ensure that every entry is witnessed by the pub, club or arcade owner.

ACTION



So you think that all pinball machines look the same eh? Just a playfield and a sit-up-and-beg backsplash. Well, have we got news for you! The word is that Williams are bringing out a pin that could revolutionise the image of the pin table forever. Well, until the next revolution anyway!

Based on the Williams video game called Joust — which features flying beasts and gallant knights — the company's new pin can be played by two players. So what's new about that, I hear you ask. But they play both at the same time — ever seen that before smarty!

Yes, Joust — the pinball, can be played by two players at opposite ends of the table one is the attacker, the other the defender. Roles reverse when the ball is lost.

Meanwhile back to the more conventional side of the pinball market and Zaccaria have a new pin called Time Machine.

The special feature on this machine goes into action when you get the ball into a saucer about two-thirds of the way up on the left hand side of the playfield. Then the three pop-bumpers disappear into the bowels of the machine and a flat surface takes its place. This takes you into the "past". When the bumpers are up it's the "future".

This feature makes Time Machine two games in one.



ALIENS TAKE A TUMBLE

XEVIOUS

For Scramble and Zaxxon fans who enjoy a good battle over scrolling scenery, Xevious holds new graphical and action thrills.

The story is set in Earth's future with the massive Xevious fleet gradually taking control of the world we humans know as home.

In true *Boys' Own* style, a hero is despatched to strike deep into the Xevions' home territory and destroy their mothership.

Xevious forces are to be found on the ground and in the air. Bombing and firing away as he did in Zaxxon, but this time from a different angle and viewpoint the player takes on one batch of Xevions after another. Each wave gets progressively difficult.



A crosshair sight preceding his craft helps the player judge his range.

If it all sounds too familiar, the difference Xevious boasts is in a detailed and varied backdrop to the action and some marvellous effects from the opposing fleet as they roll, tumble or zoom in towards you.

My own favourites are the turning mirrors which spin slowly as you approach them.

The Mothership also puts up an almighty barrage to prevent you placing your ranging site over its vulnerable core.

Rivers, roads, forests and airstrips form the backdrop to the action. Operators are given a lot of leeway over how difficult Xevious can be for the beginner, so if you find it too hard or too easy have a word in the arcade owner's ear.

A LONG HAUL AFTER AN EXOTIC BIRD

ROC N' ROPE

That legendary bird of fortune, the Roc, takes the place of Donkey Kong's starlet in a new game, Roc n' Rope.

The Roc is every bit as elusive to capture as Kong's starlet was to save and like her, it leaves hints to its whereabouts strewn around the vicinity in the shape of golden feathers.

Mario's place is taken by an intrepid explorer who is betting on new technology to take him past the horrors and dangers of the primeval labyrinth of caves, trees and terraces.

Whether or not his bet is well-founded, depends on you as you guide his progress to the Roc at the top of the screen. The first screen is laid out with rock ledges. You climb with the aid of a rocket gun which has a rope attached to its pointed tip. As it imbeds itself in the next level, you anchor the far end and begin your ascent. Cavemen and dinosaurs are out to stop you but you are equipped with a flash which can be used to blind them.

Cavemen are quite capable of following you up a rope or shaking you down from it, but flash blindness renders both they and the dinosaurs helpless for a while.

The cave-dwellers can change levels by climbing up or down vines and are difficult to shake off your trail. Points are gained for picking up golden feathers and if the player finds a golden egg he will become super-powered and invincible for a while, destroying his enemies at a touch.

Rock stairways, fountains and a prehistoric revolving door type escalator, feature in the later screens but the dinosaurs and cavemen are to be found on every one.

Like most of the Kong-type games, the successful players will memorise a good route and follow it to the top again.



DON'T LET THEM BREAK YOUR CHAIN

DOMINO MAN

Remember lining up a snake of dominoes and sending it sprawling with a careless flick of your little finger at one end or another.

Well domino flicking is big business in the States at the moment with teams trying to produce new record flicks and ever more impressive displays.

The trend is recreated in Domino Man where you take the title role and set up dominoes in a chain behind the supermar.

Dominoes are set up merely by touching them but you have to do it before an old lady with a bag, a bully, or a little boy knocks part of your chain over. You can knock them out of the way. Then there's this bee which wanders around so slowly that you may feel tempted to go and find out what it's doing on screen — don't, it stings!

After conquering the supermarket you can move onto the golf course, where a small dog threatens domino destruction or onto the construction site.

You can trap certain of your enemies in the domino chain for extra points and other bonuses can be achieved by finishing your screen in a good time.

The dominoes are laid out in easy to assemble chain and tactics usually centre on whether you go for a whole chain at once or shorter chains which are easy to rebuild if knocked over.

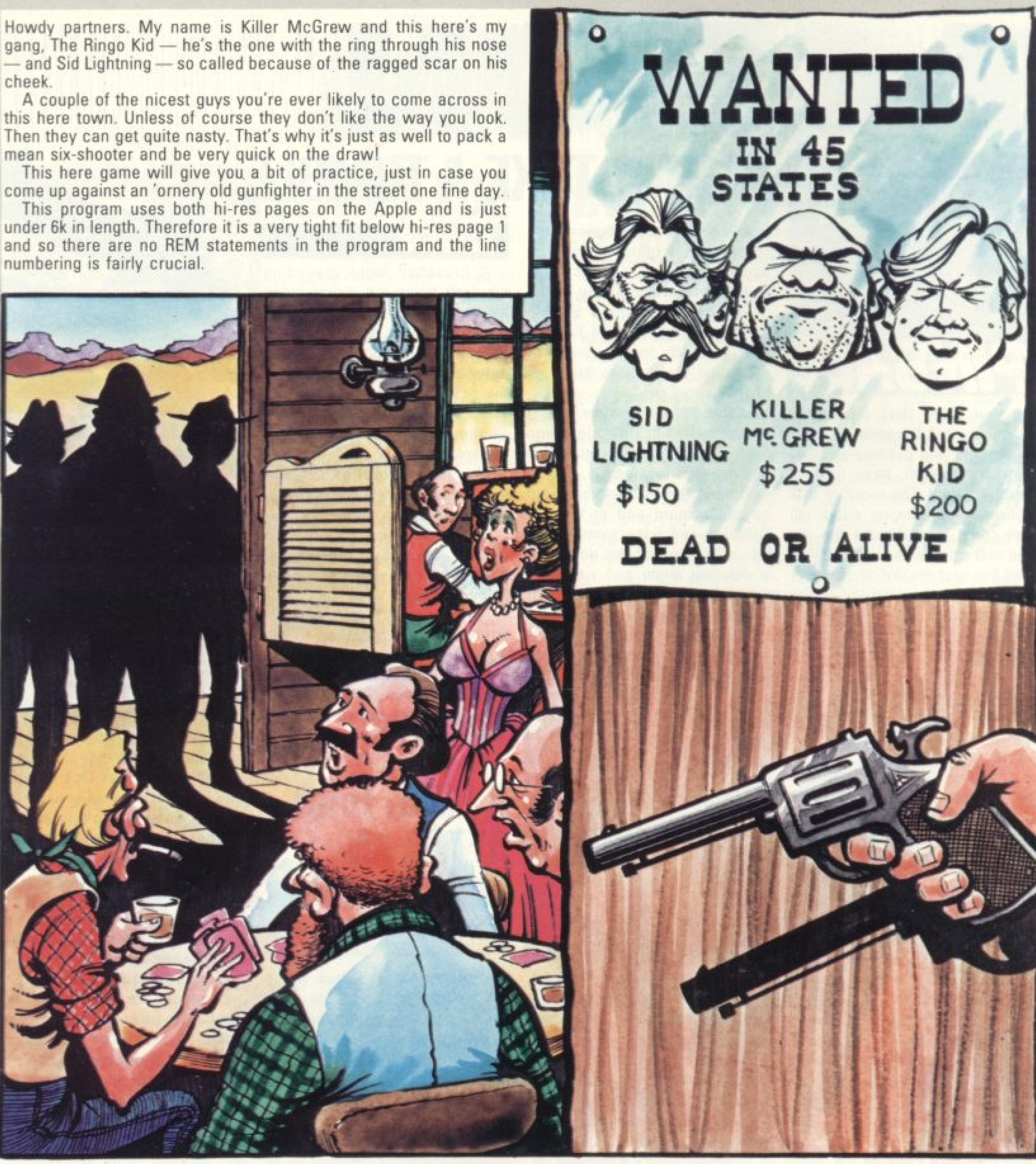
Illustrations: Terry Rogers

Howdy partners. My name is Killer McGrew and this here's my gang, The Ringo Kid — he's the one with the ring through his nose — and Sid Lightning — so called because of the ragged scar on his cheek.

A couple of the nicest guys you're ever likely to come across in this here town. Unless of course they don't like the way you look. Then they can get quite nasty. That's why it's just as well to pack a mean six-shooter and be very quick on the draw!

This here game will give you a bit of practice, just in case you come up against an 'ornery old gunfighter in the street one fine day.

This program uses both hi-res pages on the Apple and is just under 6k in length. Therefore it is a very tight fit below hi-res page 1 and so there are no REM statements in the program and the line numbering is fairly crucial.



Illustrations: Terry Rogers

BY ROBERT PENROSE

QUICKDRAW

RUNS ON AN APPLE IN 6K

```
1  GOTO 47
2  FOR I = 40 TO 1 STEP  - 1: POKE PIT,I: POKE DUR,5: CALL NOISE: CALL NOIS
E: NEXT : RETURN
3  FOR J = 1 TO 2000: NEXT : RETURN
4  HOME : VTAB 21: HTAB 1: RETURN
5  POKE 790,255:OP$ = "KILLER MCGREW": RETURN
6  POKE 790,200:OP$ = "THE RINGO KID": RETURN
7  POKE 790,150:OP$ = "SID LIGHTNING": RETURN
8 X = 200:Y = 130:SHOTS = 0:SC = 0
9  POKE  - 16368,0: PRINT "WHEN YOU SEE THE GLASS - FIRE!!": GOSUB 3: POKE
 - 16302,0: GOSUB 3: GOSUB 4
10  IF  PEEK ( - 16384) > 127 THEN  GOSUB 2: POKE  - 16301,0: PRINT "OUCH!!
 YOU JUST SHOT YOUR FOOT!": GOSUB 3:SHOTS = SHOTS + 1: GOTO 19
11  POKE 230,32: SCALE= 1: ROT= 0: XDRAW 5 AT X,Y: CALL 791: CALL 791: XDRA
W 5 AT X,Y
12  IF  PEEK ( - 16384) > 127 THEN  GOTO 15
13  POKE  - 16299,0: GOSUB 2: GOSUB 3: GOSUB 3: POKE  - 16300,0: POKE  - 16
301,0: GOSUB 4: IF  PEEK ( - 16384) > 127 THEN  PRINT "NOT QUICK ENOUGH!":S
HOTS = SHOTS + 1: GOSUB 3: GOTO 19
14  PRINT "COME ON! YOU ARE SUPPOSED TO SHOOT!": PRINT "I AM NOT PLAYING BY
 MYSELF!": GOSUB 3: GOSUB 3: GOTO 19
15  POKE  - 16299,0: GOSUB 2: POKE 230,64
16  POKE PIT,120: POKE DUR,100: CALL NOISE
17  FOR I = 0 TO 48 STEP 8: ROT= I: SCALE= I / 8 + 1: XDRAW 6 AT X,Y: FOR J
 = 1 TO 10: NEXT : XDRAW 6 AT X,Y: NEXT : GOSUB 3
18 SHOTS = SHOTS + 1:SC = SC + 1: POKE  - 16300,0: POKE  - 16301,0
19  GOSUB 4: PRINT SC;" OUT OF ";SHOTS
20  IF SHOTS = 6 THEN  POKE  - 16368,0: GOTO 72
21  GOSUB 3: GOSUB 4: GOTO 9
22  FOR I = 791 TO 797: READ J: POKE I,J: NEXT
23  DATA     173,22,3,32,168,252,96
24  RETURN
25  HPLOT 220,100 TO 75,100 TO 75,80 TO 200,80 TO 200,100: HPLOT 150,65 TO
200,65: HPLOT 0,141 TO 270,141
26  HPLOT 100,50 TO 100,40 TO 105,30 TO 145,30 TO 150,40 TO 150,50 TO 145,6
0 TO 105,60 TO 100,50: HPLOT 105,50 TO 105,40 TO 110,35 TO 140,35 TO 145,40
 TO 145,50 TO 140,55 TO 110,55 TO 105,50
27  HPLOT 95,68 TO 105,68: HPLOT 99,66 TO 101,66 TO 102,68 TO 102,70 TO 101
,72 TO 99,72 TO 98,70 TO 98,68 TO 99,66: HPLOT 99,69: HPLOT 101,69: HPLOT 9
9,71 TO 101,71
28  HPLOT 93,80 TO 93,75 TO 96,72 TO 104,72 TO 107,75 TO 107,80: HPLOT 106,
80 TO 106,76 TO 104,74 TO 104,80: HPLOT 94,80 TO 94,76 TO 96,74 TO 96,80: H
PLOT 96,78 TO 97,78 TO 97,72: HPLOT 98,72 TO 98,78 TO 102,78 TO 102,72: HPL
OT 103,72 TO 103,78 TO 104,78
29  RETURN
30  HPLOT X,Y TO X,Y - 6 TO X + 2,Y - 8 TO X + 2,Y - 10 TO X + 3,Y - 10 TO
X + 3,Y - 8 TO X + 5,Y - 6 TO X + 5,Y TO X,Y: HPLOT X,Y - 6 TO X + 5,Y - 6:
 HPLOT X,Y - 3 TO X +5,Y - 3: RETURN
31  FOR I = 770 TO 789: READ J: POKE I,J: NEXT : REM     SOUND
32  DATA 172,1,3,174,0,3,173,48,192,202,224,0,208,251,136,192,0,208,240,96
33  RETURN
34  FOR I = 24577 TO 24926: READ J: POKE I,J: NEXT
35  DATA 6,0,14,0,87,0,163,0,241,0,63 ,1, 88,1,118,115,94,187,118,115,115,1
15,107,107,107,115,115,123,99,123,123,115,115,118,115,118,115,115,107,107,1
07,227,103,99,99,99,99,107,67,99,99,99,227,99,99,99,107,115,115,115,107,99,
99,99,99,99,227
36  DATA    76,99,99,99,99,99,227,191,246,91,107,107,107,107,107,107,109,91,
88,0
37  DATA 118,243,78,171,118,115,115,115,123,123,123,115,115,107,99,107,107,
115,243,118,243,118,115,115,123,123,123, 99,101,99,99,99,99,123,67,99,99,99
, 99,97,99,99,123,115,115,115,123,99,99,99,99,99,99
38  DATA      92,99,99,99,99,99, 99,173,118,73,123,123,123,123,123,123,123,12
3,123,123,91,88,0
39  DATA  118,115,94,187,118,115,115,107,107,107,115,115,123,99,123,123,115
,115,118,115,118,115,115,107,107,107,227,103,99,99,99,99, 99,100,99,107,107
,67,107,67,107,120
40  DATA  123,187,87,123,99,123,123,67,107,107,99,99,227,76,99,99,99,99,99,
```

ANIROG SOFTWARE



XENO II

An E-XPANDED-D screen presentation with superb action packed space thriller, written entirely in machine code with four action packed stages. To destroy the power source of Xeno II, you have to fight off waves of robot attack, plasma bombing by the legions of the outer sanctum and finally attack the power source protected by a force field, continuous bombardment by guardians and blockading by wild whirling suicidal space ships. Truly a game for all arcadians.

JS VIC 20 16K £7.90

CAVERN FIGHTER

All M/C version of SCRAMBLE. Lasers, bombs, continuous scoring and sound effects give all the thrills of arcade game. Pilot your space ship through the tortuous tunnels and caverns destroying enemy missile launchers, fuel dumps and airborne fire saucers. Four ships to complete mission. 10 skill levels.

KB/JS VIC 20 Unexp. £6

CRAWLER

All M/C version of Centipede. Homing spiders, mushroom laying fleas and multi-direction travel makes this game fast and furious, with 10 skill levels.

JS VIC 20 Unexp. £6

PHARAOH'S TOMB

Once you enter, the only way out is with the aid of a key which unlocks the mystery of the Pharaoh's tomb. Beware of the mantraps the ancient Egyptians so painstakingly built. One false move and you will meet the same fate as befell other tomb robbers over thousands of years. A multi-screen big graphical adventure with M/C movements.

KB VIC 20 16K £6.00

SEVEN PROGRAMS (VOL 1)

Hi-res games for the whole family. Board game Othello plus Bomber, Slalom, Bounce out, Lunar Docker, Memory and Snake.

KB VIC 20 Unexp. £6.00

SEVEN PROGRAMS (VOL 2)

Another Hi-res games pack for the family Graphical Adventure, Goblins Gold, plus Dare Devil, Ghosts, Grand Prix, Breakout, Cobra and Minefield.

KB VIC 20 Unexp. £6.00

DOTMAN

Ghosts chase you as you try to eat the dots and collect points. You can turn the tables on them by eating the pills. Don't forget the ghosts have been given intelligence and will try to corner you. This feature makes Dotman exciting and challenging. All M/C game complete with running and highest scores and tunnels.

JS/KB VIC 20 Unexp. £6.00

ZOK'S KINGDOM

Your starcruiser badly damaged in a meteor storm is forced to crash land on the planet ruled by ZOK, a time space generated image of Dracula. You are challenged to a battle of wits and endurance as the battle for survival starts in earnest in this big multi-screen graphical adventure in hi-res graphics and M/C movements.

KB/JS VIC 20 16K £6

KRAZY KONG

An E-XPANDE-D screen, large graphics, rolling barrels, hammer, fireballs, lifts, handbags and umbrellas as you try to rescue the damsel Kong has abducted. Spectacular collapse of Kong's lair in the fourth screen. Uses all 21K of your expanded Vic for this 100% M/C thriller. Complete with high score table.

KB/JS VIC 20 16K £7.90

GALACTIC ABDUCTORS NEW

A stunning action packed game which uses all of your TV screen for the superb large animated graphics. Giant Space Hawks whirl and weave in intricate patterns as they drop their deadly homing mines which will destroy your base on contact. While you are busy defending yourself, the Hawks will feed on your helpless population returning only their skulls. All M/C game complete with high score table that will blow your mind with its graphics and sound effects.

JS VIC 20 16K £7.90

FROGRUN NEW

Popular arcade game. All machine code with brilliant colour graphics and sound effect. Features include snakes, crocodiles, lady frogs, turtles, cars, lorries and logs.

KB/JS	VIC 20	Unexp.	£6
KB/JS	SPECTRUM	16K/48K	£6
KB/JS	COMMODORE 64		£6

DRACULA

Count Dracula is asleep somewhere in his castle. He rises at midnight and you must find him and drive a stake through his heart before he rises. A multi-screen graphic adventure.

KB VIC 20 3K £6

TINY TOT'S SEVEN

Super games pack for younger children with bright colour graphics and sound effects. Everybody's favourite Simon plus Super Snap, O's and X's, Word Jumble, Bomber, Duck Shoot and Mad Drivers.

KB VIC 20 Unexp. £6.00

3D TIME TREK NEW

At last a 3D game for the VIC! Although badly wounded, you are determined to seek and destroy the marauding space pirates who have now dispersed around the galaxy in search of fresh prey. A brilliant Startrek game with a difference — spectacular 3D graphics and real arcade actions

JS VIC 20 16K £6.00

SOFTWARE WRITERS

We are looking for top class writers to join our growing software team. If you have written a quality game for VIC 20, SPECTRUM, DRAGON 32, ORIC 1 or COMMODORE 64, then contact us. We pay top royalties for accepted programmes.

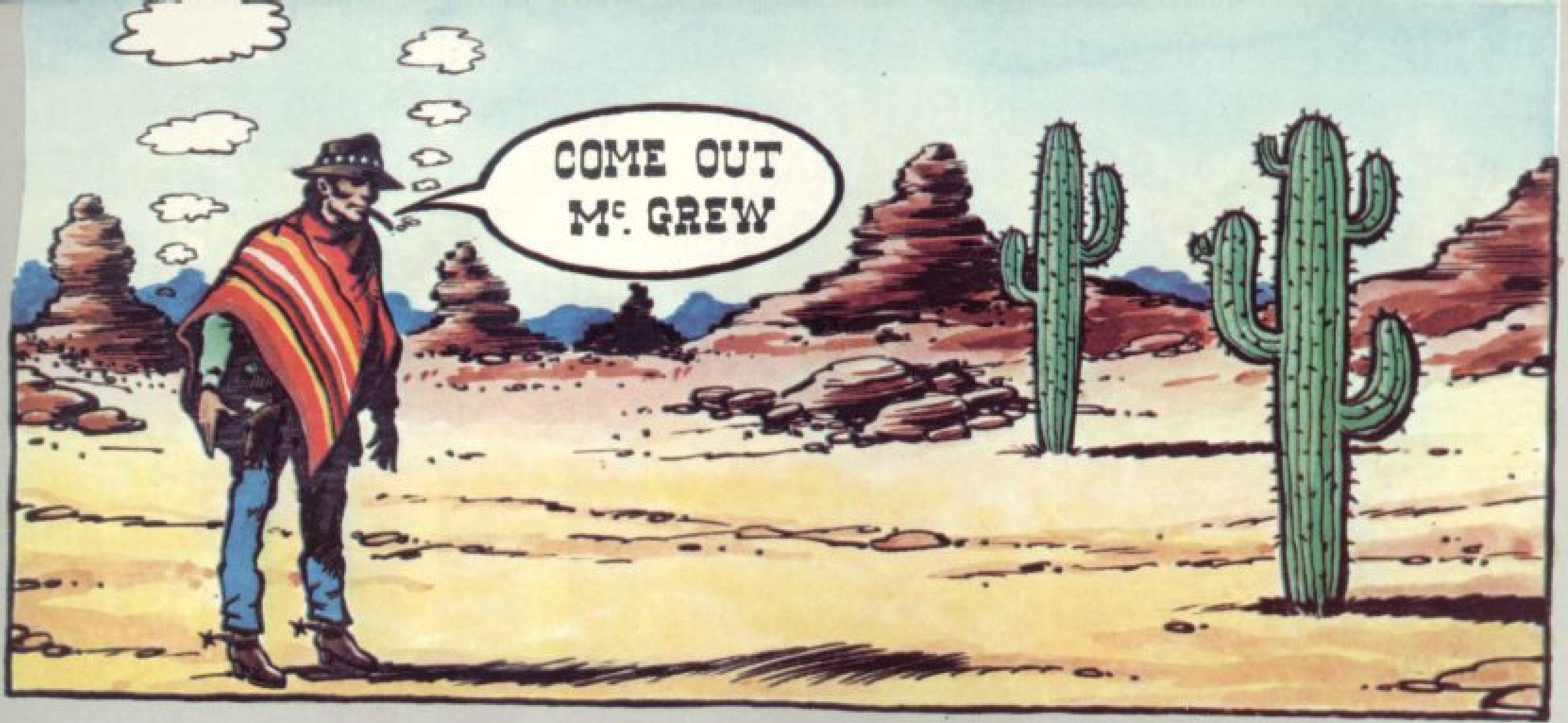
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26 BALCOMBE GARDENS
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ENQUIRIES: HORLEY (02934) 2007/6083

```
227,191,246,91,107,107,107,107,107,107,107,107,107,107,91,88,0
41  DATA 118,243,78,171,118,115,115,123,123,123,115,115,107,99,107,107,115,
243,118,243,118,115,115,123,123,123,99,101,99,99,99,99,227,100,99,123,123,6
7,123,67,251,104
42  DATA   107,171,85,107,99,107,107,67,123,123,99,99, 99,92,99,99,99,99,99
, 99,173,118,73,123,123,123,123,123,123,123,123,123,123,91,88,0
43  DATA  100,123,123,123,115,115,115,115,115,107,107,107,99,99,99,99,107,1
07,115,115,123,123,91,88,0
44  DATA  176,92,107,95,88,0
45  POKE 232,1: POKE 233,96
46  RETURN
47 N = 1:HC = 3:PIT = 768:DUR = 769:NOISE = 770: HGR : HGR2
48  TEXT : HOME : VTAB 10: HTAB 15: INVERSE : PRINT "QUICKDRAW": GOSUB 22:
GOSUB 31
49  POKE PIT,140: POKE DUR,50: CALL NOISE: FOR I = 40 TO 1 STEP  - 1: POKE
PIT,I: POKE DUR,20: CALL NOISE: CALL NOISE: NEXT
50  VTAB 15: HTAB 8: PRINT "FASTEST GUN IN THE WEST": NORMAL
51  FOR I = 32 TO 64 STEP 32: POKE 230,I: HCOLOR= HC: GOSUB 25
52 Y = 65: FOR X = 155 TO 185 STEP 10: GOSUB 30: NEXT
53  NEXT
54  GOSUB 34
55  ROT= 0: SCALE= 1
56  POKE 230,32: XDRAW 1 AT 10,120: XDRAW 5 AT 112,76
57  POKE 230,64: XDRAW 3 AT 10,120: XDRAW 5 AT 112,76
58  VTAB 20: HTAB 11: PRINT "SPACE BAR TO FIRE": GOSUB 3
59  POKE  - 16304,0: POKE  - 16301,0: POKE  - 16300,0
60  VTAB 21: PRINT "WHAT DO YOU CALL YOURSELF?"
61  VTAB 23: INPUT "";N$
62  GOSUB 4: PRINT "WELL ";N$: PRINT "LET'S PRACTICE YOUR DRAW"
63  GOSUB 3: POKE  - 16302,0: GOSUB 3
64  FOR I = 1 TO 4: POKE  - 16299,0: FOR J = 1 TO 1500: NEXT : POKE  - 1630
0,0: FOR J = 1 TO 500: NEXT : NEXT
65  POKE  - 16301,0
66  GOSUB 4: PRINT "THAT'S ENOUGH! ";N$: PRINT "WE DON'T WANT YOU TO STRAIN
 SOMETHING!"
67  GOSUB 3: GOSUB 3: GOSUB 4
68  PRINT "LET'S SHOOT AT SOME GLASSES": PRINT "DON'T SHOOT TOO SOON": PRIN
T "OR YOU'LL BLOW YOUR FOOT OFF!!"
69  GOSUB 3
70  ON N GOSUB 5,6,7
71  GOSUB 3: GOSUB 4: GOTO 8
72  ROT= 0: SCALE= 1: GOSUB 3: GOSUB 4: IF SC > 2 THEN 76
73  PRINT "DREADFUL!": PRINT "WANT TO QUIT? (Y/N) ";: INPUT "";Z$: IF Z$ =
"N" THEN  GOSUB 4: GOTO 8
74  GOSUB 4: PRINT "THAT MIGHT NOT BE POSSIBLE!": IF  RND (1) > .5 THEN 78
75  GOSUB 3: TEXT : HOME : PRINT "O.K. QUIT WHILE THE GOING'S GOOD. BYE!":
END
76  IF SC > 4 THEN 78
77  PRINT "YOU WON'T SURVIVE AGAINST ";OP$: PRINT "GO BACK AND PRACTICE AGA
IN!": GOSUB 3: GOSUB 3: GOSUB 4: GOTO 8
78  PRINT "OH! OH! HERE COMES ";OP$
79 X1 = 260:X2 = 262:Y = 120: POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10
,120: XDRAW 2 AT X2,Y: GOSUB 3
80  POKE 230,32: XDRAW 2 AT X1,Y: POKE  - 16302,0
81  POKE 230,64: XDRAW 2 AT X2,Y:X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE  - 1629
9,0
82  POKE 230,32: XDRAW 2 AT X1,Y:X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE  - 1630
0,0
83  IF X1 <  > 200 THEN 81
84  POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT 202,120:
XDRAW 4 AT 200,120
85  POKE  - 16301,0: POKE 230,32
86  GOSUB 4: PRINT "WHEN THE GLASS SMASHES ON THE FLOOR": PRINT : PRINT "FI
RE!!"
87  GOSUB 3: FOR I = 64 TO 32 STEP  - 32: POKE 230,I: XDRAW 5 AT 112,76: NE
XT
88 Y = 76: FOR I = 112 TO 208 STEP 3: XDRAW 5 AT I,Y: FOR J = 1 TO 50: NEXT
```




```
 : XDRAW 5 AT I,Y: NEXT
89 X = I: FOR I = Y TO 96 STEP 3: XDRAW 5 AT X,I: FOR J = 1 TO 50: NEXT : X
DRAW 5 AT X,I: NEXT
90  POKE  - 16368,0
91  POKE PIT,100: POKE DUR,50: CALL NOISE
92  CALL 791
93  IF  PEEK ( - 16384) > 127 THEN 103
94  POKE  - 16302,0: POKE  - 16299,0: GOSUB 2
95  POKE 230,32: XDRAW 1 AT 10,120: ROT= 48: XDRAW 1 AT 10,138: ROT= 0: GOS
UB 4: POKE  - 16300,0: POKE  - 16301,0
96  PRINT "OH DEAR!": FOR J = 1 TO 1000: NEXT
97  FOR I = 0 TO 10: READ A,B,C: POKE PIT,A: POKE DUR,B: CALL NOISE: FOR J
= 1 TO C: NEXT : NEXT
98  DATA 250,255,200,250,255,200,250,80,100,250,255,200,220,255,200,250,80,
100,255,255,200,250,80,100,255,255,200,250,80,100,255,255,500
99  POKE  - 16368,0
100  CALL  - 912: PRINT "PLAY AGAIN ? ";: GET Z$
101  IF Z$ <  > "Y" THEN  TEXT : HOME : PRINT "BYE!": END
102  RESTORE : GOTO 47
103  POKE  - 16368,0: POKE  - 16302,0: POKE  - 16299,0: GOSUB 2: GOSUB 3
104  POKE 230,32: XDRAW 2 AT 200,120: ROT= 16: XDRAW 2 AT 200,138: ROT= 0:
GOSUB 4: POKE  - 16300,0
105  GOSUB 3: GOSUB 3
106  POKE 230,64: XDRAW 3 AT 10,120: XDRAW 1 AT 10,120: XDRAW 4 AT 200,120:
 ROT= 16: XDRAW 2 AT 200,138: ROT= 0: XDRAW 2 AT 262,120
107 X1 = 260:X2 = 262:Y = 120: POKE 230,32: XDRAW 2 AT X1,Y
108  POKE 230,64: XDRAW 2 AT X2,Y:X2 = X2 - 4: XDRAW 2 AT X2,Y: POKE  - 162
99,0
109  POKE 230,32: XDRAW 2 AT X1,Y:X1 = X1 - 4: XDRAW 2 AT X1,Y: POKE  - 163
00,0
110  IF X1 <  > 208 THEN 108
111  POKE 230,64: ROT= 16: XDRAW 2 AT 200,138: XDRAW 2 AT 202,138:Y1 = 138:
 POKE  - 16299,0
112  POKE 230,32: ROT= 0: XDRAW 2 AT X1,Y: ROT= 16: XDRAW 2 AT X1 - 8,Y1:X1
 = X1 + 4: XDRAW 2 AT X1 - 8,Y1: ROT= 0: XDRAW 2 AT X1,Y: POKE  - 16300,0
113  POKE 230,64: ROT= 0: XDRAW 2 AT X2,Y: ROT= 16: XDRAW 2 AT X2 - 8,Y1:X2
 = X2 + 4: XDRAW 2 AT X2 - 8,Y1: ROT= 0: XDRAW 2 AT X2,Y: POKE  - 16299,0
114  IF X2 <  > 262 THEN 112
115  POKE 230,32: XDRAW 2 AT X1,Y: XDRAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X
1 - 8,Y1: ROT= 0: POKE  - 16300,0
116  POKE 230,64: XDRAW 1 AT 10,120: XDRAW 3 AT 10,120: XDRAW 2 AT X2,Y: XD
RAW 5 AT 112,76: ROT= 16: XDRAW 2 AT X2 - 8,Y1: ROT= 0
117  POKE  - 16301,0: PRINT "YOU'RE STILL HERE!": PRINT "MORE PRACTICE NOW
YOUR FAMOUS!"
118  GOSUB 3: GOSUB 3
119 N = N + 1: IF N <  > 4 THEN 70
120  GOSUB 4: PRINT "I'M AFRAID YOU'RE NOW TOO FAST!": PRINT "NO-ONE WILL C
HALLENGE YOU AGAIN!": PRINT "I'M OFF!": GOSUB 3: GOSUB 3: TEXT : HOME : PRI
NT "BYE!!"
```

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```
100 CALL SCREEN(16):: CALL CLEAR
 :: CALL MAGNIFY(2):: RANDOMIZE
110 REM ******************
120 REM *    SUBSTRIKE    *
130 REM *    BY FIREFLY   *
140 REM * EXTENDED BASIC*
150 REM ******************
160 SD=2000 :: SPEED=7
170 FOR CHAN=1 TO 6 :: CALL COLO
R(CHAN,16,2):: NEXT CHAN
180 DISPLAY AT(1,1):"SCORE 0"
190 CALL CHAR(96,"FFFFFFFFFFFFFF
FF0000342822FF7E3C8")
200 CALL CHAR(104,"FFFFFFFFFFFFF
FFF00000618186FFFF7E")
210 CALL CHAR(112,"FFFFFFFFFFFFF
FFF4701342910465315641669264243 42
6547653674652434545665473841 6792
6344244234343 1413")
220 CALL COLOR(9,8,1,10,6,1,11,5
,1)
230 FOR A=24 TO 20 STEP -1
240 CALL HCHAR(A,1,112,32)
250 NEXT A
260 FOR B=19 TO 16 STEP -1
270 CALL HCHAR(B,1,104,32)
280 NEXT B
290 FOR C=15 TO 12 STEP -1
300 CALL HCHAR(C,1,96,32)
310 NEXT C
```

```
320 DISPLAY AT(24,1)SIZE(7):"FIR
EFLY"
330 IF RND<.5 THEN CALL SPRITE(#
1,97,15,75,RND*190+1,0,-5)ELSE C
ALL SPRITE(#1,97,15,75,RND*190+1
,0,10)
340 G=INT(RND*56)+100
350 M=INT(RND*170)+10
360 V=INT(RND*2)+1
370 IF V=2 THEN CALL SPRITE(#2,1
05,2,G,M,0,-SPEED)ELSE CALL SPRI
TE(#2,105,2,G,M,0,SPEED)
380 CALL SOUND(-4250,110,15,-1,1
5,SD,10)
390 IF GM=1 THEN SD=SD-50
400 CALL POSITION(#3,Y1,X1):: IF
 Y1>183 THEN 520
410 CALL COINC(ALL,HIT):: IF HIT
=-1 THEN 670
420 CALL KEY(1,K,S):: IF S=0 OR
S=-1 THEN 380
430 IF K=2 THEN CALL MOTION(#1,0
,-7)
440 IF K=3 THEN CALL MOTION(#1,0
,7)
450 IF K=12 AND X=0 THEN 470
460 GOTO 420
470 REM ***DEPTH CHARGE***
480 CALL POSITION(#1,Y,X)
490 CALL SPRITE(#3,46,7,Y+10,X,1
```

SUBSTRIKE

Your enemies under the waves run silent and run deep — waiting to catch you off guard and send you to a watery grave with a well aimed torpedo. Can you outwit these silent denizens of the deeps?

You are in command of a destroyer hunting for these deadly submarines. Once you pick up one on your radar screen the action starts. Simply line up your depth charges and blast away until you have destroyed the enemy sub. If you miss the submarine will surface and fire at you — and there is no escape from the deadly missiles.

Each time you hit a sub you score points — and another metallic monster will appear under the waves.

You control your ship using the cursor keys 's' and 'd' and the 'f' key fires your depth charges.

RUNS ON A TI 99/4a IN EXTENDED BASIC

BY FIREFLY



Illustration: Jon Davis

```
0,0)
500 X,GM=1 :: SD=SD-20
510 GOTO 380
520 REM *CHARGE HIT BOTTOM*
530 CALL POSITION(#3,Y,X):: CALL
 DELSPRITE(#3)
540 CALL SPRITE(#4,113,12,183,X)
550 FOR A=1 TO 2
560 CALL PATTERN(#4,114):: CALL
COLOR(#4,RND*12+3)
570 CALL PATTERN(#4,115):: CALL
COLOR(#4,RND*12+3)
580 CALL PATTERN(#4,113):: CALL
COLOR(#4,RND*12+3)
590 CALL PATTERN(#4,46):: CALL C
OLOR(#4,RND*12+3)
600 CALL SOUND(-500,-5,0)
610 NEXT A
620 G=G-6 :: CALL POSITION(#2,A,
B):: CALL LOCATE(#2,G,B)
630 CALL POSITION(#2,Y,X)

640 IF Y<100 THEN 660
650 GM,X,S=0 :: SD=2000
660 GOTO 380
670 REM **HIT SUBMARINE**
680 CALL DELSPRITE(#3)
690 IF V=2 THEN CALL MOTION(#2,5
,-10)ELSE CALL MOTION(#2,5,10)
700 CALL SOUND(-200,-6,0):: CALL
 COLOR(#2,10)
710 CALL POSITION(#2,A,B):: IF A
>163 THEN 720 ELSE 710
720 CALL PATTERN(#2,113):: CALL
COLOR(#2,12)
730 CALL SOUND(-1000,-4,0)
740 CALL SOUND(-1000,-6,0)
750 CALL MOTION(#2,0,0)
760 CALL POSITION(#2,Y,X):: CALL
 DELSPRITE(#2)
770 FOR B=5 TO 10
780 CALL SPRITE(#B,46,RND*2+9,Y,
X,-10,SGN(RND-.5)*20)
790 NEXT B
800 FOR D=5 TO 10
810 FOR DEL=1 TO 20 :: NEXT DEL
820 CALL DELSPRITE(#D)
830 NEXT D
840 SCORE=SCORE+1 :: DISPLAY AT(
1,1):"SCORE";SCORE
850 SPEED=SPEED+3
860 GM,X,S=0 :: SD=3000
870 GOTO 340
880 REM ***BOAT HIT***
890 CALL MOTION(#1,0,0)
```

```
900 CALL POSITION(#1,C,D)
910 CALL POSITION(#2,A,B)
920 CALL SPRITE(#5,46,16,A,B)
930 U=C-A :: V=D-B :: D1X=SGN(U)
:: D1Y=SGN(V):: D2X=D1Y :: D2Y=0
940 M=ABS(U):: N=ABS(V)
950 IF M>N THEN 970
960 D2X=0 :: D2Y=SGN(V):: M=ABS(
V):: N=ABS(U)
970 S=INT(M/2)
980 FOR I=0 TO M
990 CALL LOCATE(#5,A,B)
1000 S=S+N :: IF S<M THEN 1020
1010 S=S-M :: A=D1X :: B=B+D1Y :
: GOTO 1030
1020 A=A+D2X :: B=B+D2Y
1030 NEXT I
1040 FOR AS=1 TO 10
1050 CALL SOUND(200,-4,0,110,15,
210,15,310,15)
1060 CALL PATTERN(#1,115)
1070 CALL COLOR(#1,RND*12+3)
1080 CALL SCREEN(RND*12+3)
1090 CALL COLOR(#1,RND*12+3)
1100 CALL PATTERN(#1,113):: CALL
 COLOR(#1,RND*12+3)
1110 NEXT AS
1120 CALL SOUND(-1000,-5,0)
1130 CALL SCREEN(16)
1140 CALL POSITION(#1,Y,X):: CAL
L DELSPRITE(#1,#5)
1150 FOR DEL=1 TO 500 :: NEXT DE
L
1160 CALL PATTERN(#1,97)

1170 CALL COLOR(#1,15)
1180 DISPLAY AT(10,7):"PLAY AGAI
N? (Y/N)"
1190 CALL DELSPRITE(ALL)
1200 CALL KEY(0,K,S):: IF S=0 TH
EN 1200
1210 IF K=89 OR K=121 THEN 1250
1220 IF K=78 OR K=110 THEN CALL
CLEAR :: CALL DELSPRITE(ALL):: S
TOP
1230 CALL SOUND(10,110,0)
1240 GOTO 1200
1250 X=0 :: GM=0 :: SCORE=0 :: S
PEED=7 :: SD=2000
1260 DISPLAY AT(1,1):"SCORE";SCO
RE
1270 CALL HCHAR(10,5,32,22)
1280 GOTO 320
1290 END
```



The June Top Ten in Spectrum software at W. H. Smith.



Flight Simulation
Sinclair 48K £7.95



Penetrator
Melbourne House
48K £6.95

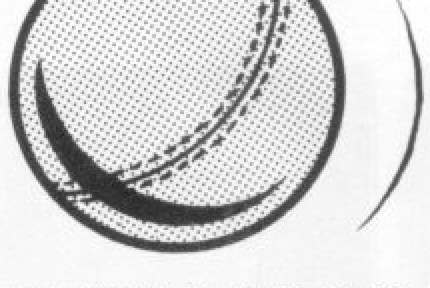
The range of software available for the Sinclair Spectrum is to say the least, extensive.

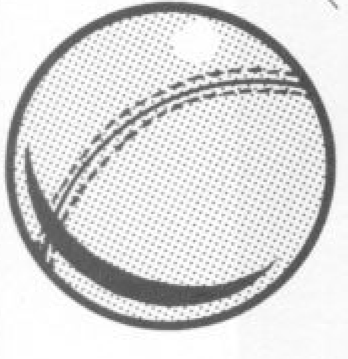
So every month at W. H. Smith, we review the range with particular reference to presentation, challenge, excitement and value for money. And because we're quite severe it's a difficult job finally to arrive at a Top Ten. But as you can see, not impossible.

You don't have to take our word for it.

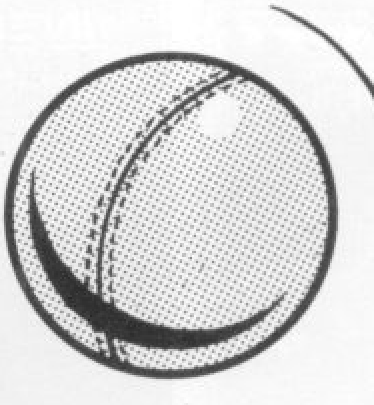
At W. H. Smith we stock the widest selection of Spectrum Software, so you can judge for yourself.

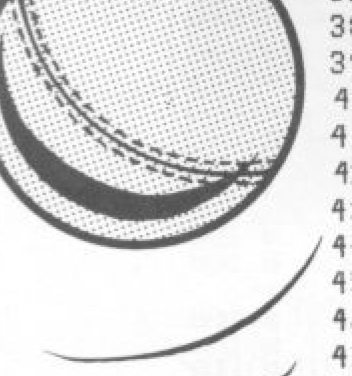
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Arcade Games			
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Space Intruders	Quicksilva	16	£4.95
Time Gate	Quicksilva	48	£6.95
Gulpman	Campbell	16	£4.95
Spectral Invaders	Bug-Byte	16	£5.00
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Sentinal	Abacus	16	£4.95

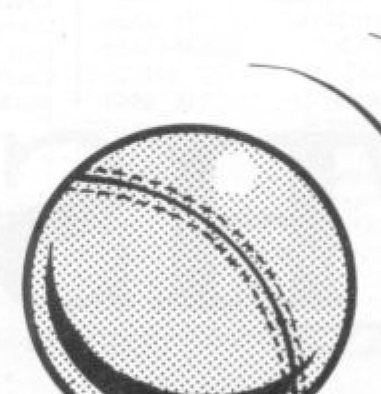




```
10 REM BALLTRAP
20 REM S.HEAP
30 MODE5:S%=1000
40 PRINT ''"DO YOU WANT SOUND"
50 INPUT"Y OR N",B$
60 IF B$="Y" N=-10 ELSE N=0
70 VDU30,9
80 U%=20+RND(800):A%=20+RND(1000):DU%=1:DA%=2:B%=3
90X%=500+RND(500):Y%=400+RND(400):DX%=-8:DY%=-4:TIME=0
100 VDU19,2,7,0,0,0
110 VDU19,3,2,0,0,0
120 GCOL0,131:CLG
130 PROC_BOX
140 PROC_BALL
150 PROC_LINE
160 IF B%=1 W%=W%+1 ELSE W%=0
170 IF W%=100 PROC_WIN:GOTO 190
180 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 140
190 IF ADVAL(0)=1 GOTO 70 ELSE GOTO 190
200 DEFPROC_BOX
210 GCOL0,0
220 MOVE16,16:DRAW1264,16
230 DRAW1264,1004:DRAW16,1004
240 DRAW16,900:DRAW160,900
250 MOVE16,900:DRAW16,800
260 DRAW160,800:MOVE16,800
270 DRAW16,16
280 GCOL0,1:MOVE24,896
290 MOVE160,896:PLOT85,160,804
300 MOVE24,804:PLOT85,24,896
310 ENDPROC
320 DEFPROC_LINE
330 GCOL0,0
340 MOVE A%,U%
350 IF ADVAL1>50000 IF A%>20 THEN A%=A%-DA%:GOTO 390
360 IF ADVAL1<10000 IF A%<1260 THEN A%=A%+DA%:GOTO390
370 IF ADVAL2>50000 IF U%<1000 THEN U%=U%+DU%:GOTO390
380 IF ADVAL2<10000 IF U%>20 THEN U%=U%-DU%
390 DRAW A%,U%
400 ENDPROC
410 DEFPROC_WIN
420 VDU28,1,19,18,15:COLOUR1:COLOUR131:CLS
430 PRINT"YOU HAVE WON"
440 T%=TIME/100:IF T%<S% S%=T%
450 PRINT"IN ";T%;" SECS"
460 IF T%<30 A$="CHAMP!!":GOTO500
470 IF T%<50 A$="GOOD!":GOTO500
480 IF T%<80 A$="NOT BAD":GOTO500
490 A$="RUBBISH-GIVE UP!!"
500 PRINT A$
510 PRINT"BEST IS ";S%;" SECS"
520 ENDPROC
530 DEFPROC_BALL
540 IF POINT(X%+DX%,Y%+DY%)<>0 GOTO580
550 IF POINT(X%+DX%,Y%)=0 DX%=-DX%
560 IF POINT(X%,Y%+DY%)=0 DY%=-DY%
570 SOUND 2,N,130,1
580 GCOL0,B%
590 PLOT 69,X%,Y%
600 X%=X%+DX%:Y%=Y%+DY%
610 IF POINT(X%,Y%)=1 B%=1 ELSE B%=3
620 GCOL0,2
630 PLOT69,X%,Y%
640 ENDPROC
```









BAT AND BALL

RUNS ON A BBC MODEL A OR B IN 16K

BY STEVE HEAP

This is an interesting variation of those very early bat and ball type video games which heralded the arcade boom all those years ago. It was written primarily for the BBC Model B but can easily be converted to work on the A or B from the keyboard.

The object of the game is to trap a bouncing ball in a coloured rectangle in the top corner of the screen. To do this a continuous line is drawn using the joystick (or keyboard controls) which slowly confines the ball in a smaller and smaller area until it is finally trapped. But beware — the ball has a nasty habit of escaping through the smallest gap in your defences!

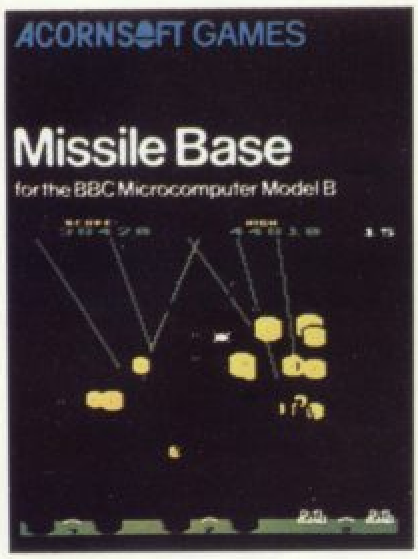
If you are successful and manage to catch the bouncing ball the time you take will be displayed — together with the best time so far. The fire button on the joystick sets up a new game at any time.

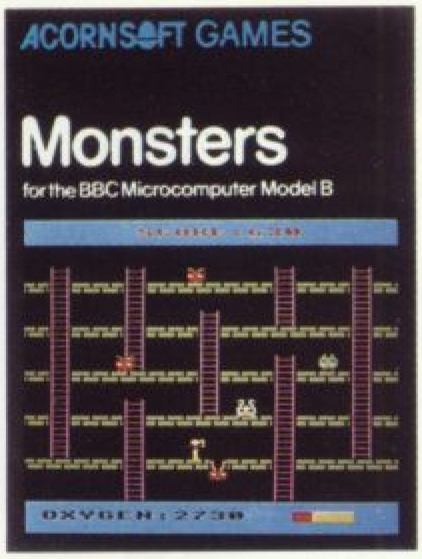
The game can be converted to work from the keyboard by changing/adding the following lines:

```
 25 ON ERROR GOTO 650
 62 *FX12,1
 64 *FX11,1
 66 *FX15,0
180 IF INKEY$(0)="N" GOTO 66 ELSE GOTO 140
190 IF INKEY$(0)="N" GOTO 66 ELSE GOTO 190
345 A$=INKEY$(0)
350 IF A$="Z" IF A%>20 THEN A%=A%-DA%:GOTO 390
360 IF A$="X" IF A%<1260 THEN A%=A%+DA%:GOTO 390
370 IF A$=":" IF U%<1000 THEN U%=U%+DU%:GOTO 390
380 IF A$="/" IF U%>20 THEN U%=U%-DU%
395 *FX15,0
650 *FX15,0
660 *FX12,0
670 MODE7:END
```

Illustration: Terry Rogers







to collect your reward.

Missile Base (price £9.95) sees you as Moon Base Commander, and you must ward off the salvos of deadly neutron missiles falling from space onto your base. As the game progresses, intelligent missiles arrive on the scene. They must be destroyed with cunning. Comes complete with satellites and planes and includes a table of high scores.

Monsters (price £9.95) is a game where your man is pursued by monsters who chase him up and down ladders and along walls. The only hope of survival is to dig holes in the walls and trap the monsters by filling them in. Complete with sound effects and high score.

Increase your business acumen.

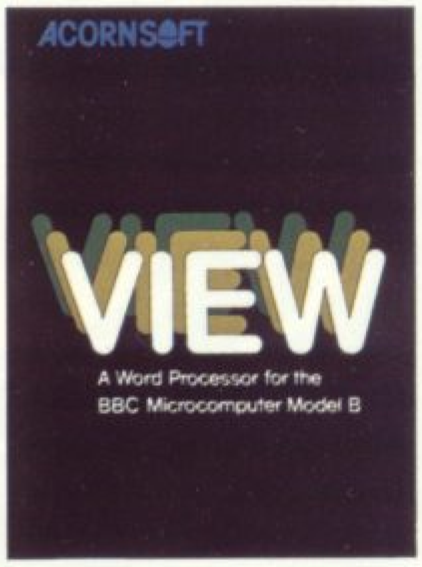
VIEW (price £59.80) is a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer.) You'll find out more by going to your dealer or by sending for the free catalogue.



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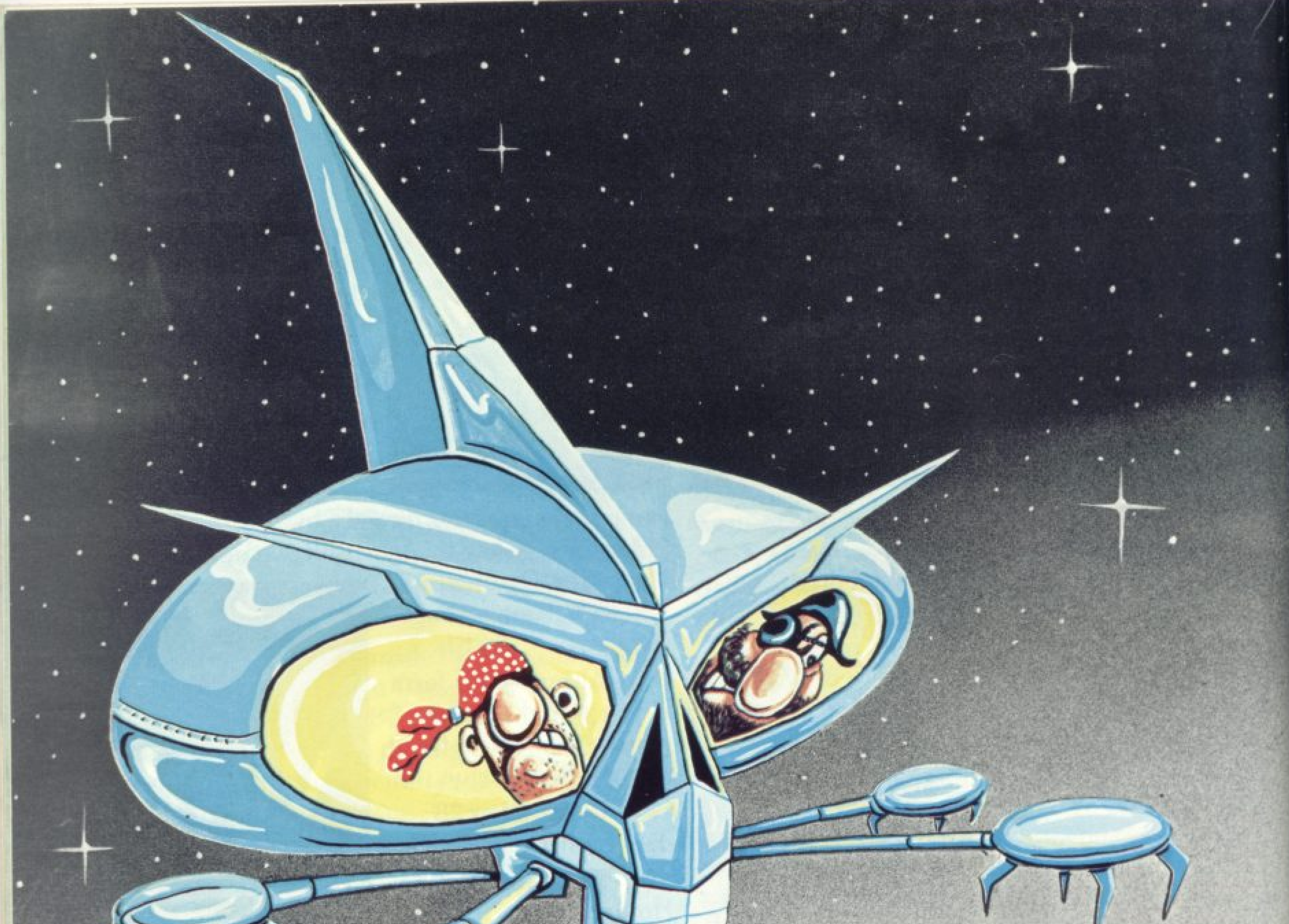
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ACORNSOFT



PROTECTOR

BY L. BRAINE

RUNS ON A VIC-20 IN 3.5K

Space piracy is ruining the economy of your sector of the galaxy and Star Fleet Command have ordered you, the skipper of an interstellar customs cruiser, to wipe out the pirates at any cost. Their plundering means that galactic taxes may have to put up — and there's an interplanetary election coming up!

Blasting off from your HQ after picking up your orders you soon pick up the space pirates fleet on your scanners. They are approaching you in force and closing fast. The odds are six to one. Your only chance is to quickly switch to hex-drive, which will give you two minutes of super-power and enable you to out manoeuvre the pirate ships and blast them out of the sky. Can you end the pirates reign of terror?

Your score will be shown at the top of the screen, and also the time you have left to complete your task. The high score is also shown.

The program is listed in two parts. First the user-defined graphics and second is the main program.

Program notes:

100-160: main loop. 400-460: ground movement routine. 500-565: joystick and your movement routine. 600-710: space pirates movement routine. 800-980: laser guns routine. 1000-1050: end of program routine.

```
5 POKE52,28:POKE56,28
10 DATA 255,255,255,255,255,255,255,255
20 DATA 0,0,0,0,0,0,0,255
30 DATA 0,0,0,0,0,0,255,255
40 DATA 0,0,0,0,0,255,255,255
50 DATA 0,0,0,0,255,255,255,255
60 DATA 0,0,0,255,255,255,255,255
70 DATA 0,0,255,255,255,255,255,255
80 DATA 0,255,255,255,255,255,255,255
90 DATA 126,90,255,189,189,36,66,36
100 DATA 0,0,0,0,63,255,31,0
110 DATA 0,12,126,255,255,254,254,0
120 DATA 0,48,126,255,255,127,127,0
130 DATA 0,0,0,0,252,255,248,0
140 DATA 73,42,0,99,0,42,73,0
170 DATA 1,3,7,15,31,63,127,255
180 DATA 128,192,224,240,248,252,254,255
190 FORI=7168+32*8TO7168+32*8+7:POKEI,0:NEXT
200 FORI=7168TO7295:READJ:POKEI,J:NEXT
210 PRINT"■LOAD"
230 POKE198,3:POKE632,19:POKE633,13:POKE634,13
READY.
```

Illustration: Dorian Cross

```
5 CLR:GOTO90
10 POKE36869,255:POKE36878,15:POKE36879,29:PRINT"■";:PA=37151:SO=36876:SC=0
20 PRINT"■■■SCORE■■@@■TIME■■@@■HISCORE■■@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
30 A$="■■■■■■■■■■■■■■■■■■■■■■■■"
35 S$="ABCDEFG@OABCCBAN@GFEFGC@ONGFEDCBAABCDEFG@OAANOANGFEDCDEFG@OAAN@GFEDCBA"
40 PRINTLEFT$(A$,21);
50 PRINT"@@@@@@@@@@@@@@@@@@@@@@@@■■PROTECTOR BY L.BRAINE.■■@@@@@@@@@@@@@@@@@@@@@@@@"
60 POKE8185,0:POKE38905,5
70 B$(1)="■KL":B$(2)="■IJ":F=1:G=10
80 FORA=1TO4:B(A)=7789+22*INT(RND(0)*9):NEXT
85 PRINTLEFT$(A$,20)"■"LEFT$(S$,22)
86 RETURN
90 I=PEEK(37151):IF(IAND32)<>0THEN90
92 GOSUB10
95 TI$="000000":PRINT"■■■■"SPC(16)HC
96 PRINT"■■"SPC(15)H$
100 FORX=1TO4
105 IFF=1THENGOSUB600
110 IFF=2THENGOSUB660
120 IFF=1THENGOSUB400
130 IFF=2THENGOSUB450
150 GOSUB500
155 PRINT"■■■■"SPC(8)RIGHT$(TI$,3)
156 IFTI$="000200"THEN1000
160 NEXTX:GOTO100
400 T$=LEFT$(S$,1):S$=RIGHT$(S$,69)+T$
410 PRINTLEFT$(A$,20)"■"LEFT$(S$,22);:RETURN
450 T$=RIGHT$(S$,1):T$=T$+LEFT$(S$,69):S$=T$
460 PRINTLEFT$(A$,20)"■"LEFT$(S$,22);:RETURN
500 A=PEEK(PA)
510 IF(AAND32)=0THEN800:RETURN
512 POKESO,0
520 IF(AAND16)=0THEN570
530 IF(AAND4)=0THENV=-1
540 IF(AAND8)=0THENV=1
545 IFG+V<5ORG+V>18THENRETURN
546 IFF=1THENPRINTLEFT$(A$,G)"■■  "
547 IFF=2THENPRINTLEFT$(A$,G)SPC(18)"  "
550 G=G+V
555 IFF=1THENPRINTLEFT$(A$,G)"■■"B$(F):RETURN
```



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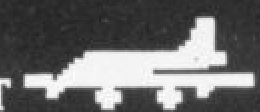


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```
560 PRINTLEFT$(A$,G)SPC(18)B$(F)
565 RETURN
570 PRINTLEFT$(A$,G)"▮▮  "SPC(14)"  "
575 IFF=1THENF=2:GOTO560
580 F=1:GOTO555
600 Z=21:K=RND(1)
610 IFK>.66THENZ=-1:GOTO630
620 IFK>.33THENZ=-23
630 IFB(X)+Z<7767ORB(X)+Z>8097THENZ=0:POKEB(X),32:B(X)=7789+22*INT(RND(0)*9):GO
TO650
640 POKEB(X),32:B(X)=B(X)+Z
650 POKEB(X),8:POKEB(X)+30720,2:RETURN
660 Z=23:K=RND(1)
670 IFK>.66THENZ=1:GOTO690
680 IFK>.33THENZ=-21
690 IFB(X)+Z<7767ORB(X)+Z>8097THENZ=0:POKEB(X),32:B(X)=7789+22*INT(RND(0)*9):GO
TO710
700 POKEB(X),32:B(X)=B(X)+Z
710 POKEB(X),8:POKEB(X)+30720,2:RETURN
800 TB=250:POKESO,0:I3=0:IFF=2THEN900
810 FORI1=7684+22*(G-1)TO7696+22*(G-1):TB=TB-1
820 POKEI1,198:POKEI1+30720,6:POKESO,TB
830 IFPEEK(I1+1)=8THENI2=I1-1:I1=7684+22*(G-1):I3=1:GOTO850
840 NEXT:POKESO,0
845 I2=7696+22*(G-1)
850 FORI4=7684+22*(G-1)TOI2:POKEI4,32:NEXT
860 IFI3=0THENRETURN
870 FORI5=1TO4:IFPEEK(B(I5)-1)=198THENI6=I5
875 NEXTI5
880 POKEB(I6),13:POKESO,250:FORZ=1TO99:NEXT
890 POKEB(I6),32:POKESO,0:POKEB(I6)-1,32
892 SC=SC+10:PRINT"▮▮▮▮"SC:IFSC>HCTHENPRINT"▮▮▮"SPC(16)SC:P=1
895 B(I6)=7789+22*INT(RND(0)*9):RETURN
900 FORI1=7697+22*(G-1)TO7685+22*(G-1)STEP-1:TB=TB-1
910 POKEI1,198:POKEI1+30720,6:POKESO,TB
920 IFPEEK(I1-1)=8THENI2=I1+1:I1=7685+22*(G-1):I3=1:GOTO940
925 NEXT
930 I2=7685+22*(G-1)
940 FORI4=7697+22*(G-1)TOI2STEP-1:POKEI4,32:NEXT
950 IFI3=0THENRETURN
960 FORI5=1TO4:IFPEEK(B(I5)+1)=198THENI6=I5
965 NEXTI5
970 POKEB(I6),13:POKESO,250:FORZ=1TO99:NEXT
972 SC=SC+10:PRINT"▮▮▮▮"SC:IFSC>HCTHENPRINT"▮▮▮▮"SPC(16)SC:P=1
980 POKEB(I6),32:POKESO,0:POKEB(I6)+1,32
985 B(I6)=7789+22*INT(RND(0)*9):RETURN
1000 PRINT"▮▮▮▮▮";:FORB=1TO330:PRINT" ";:POKESO,INT(RND(0)*120)+131:NEXT:POKESO
0
1010 IFSC<HCTHENPRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮GAME OVER.":GOTO90
1020 HC=SC
1025 PRINT"▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮NEW HIGH SCORE"
1030 FORY=1TO5
1040 FORZ=131TO254:POKESO,Z:NEXT
1045 FORZ=254TO131STEP-1:POKESO,Z:NEXT
1050 NEXTY:POKESO,0:GOTO90
```



Snakes

You can't escape the coils of this snake as it writhes around your Oric and charms even the most world weary games player. If you've played the arcade game Centipede or some similar game you'll know just what this is all about.

If not this is what you'll see. Your slippery Oric snake has to be steered around the screen with the cursor keys, gobbling up numbers which appear at random. Each time you hit a number the length of the snake increases in proportion to the size of that number — say if you eat a 5 you'll get five extra coils, and so on.

Unfortunately your snake exists in a very confined space and the more he eats the bigger he gets and the less space there is to move around — and if he crosses his own path or bites his tail then the game is all over! Oh yes, just to make things a little more interesting the screen border is definitely no place for a snake to stray. If you hit it you are dead!

This is an addictive little game which you'll be playing again and again just to get the elusive high score.

RUNS ON AN ORIC IN 16K

BY PAT NORRIS AND RICHARD JONES



```
1 REM "SNAKE" WRITTEN FOR C.& V.G..1983 R.S.JONES/P.W.NORRIS
5 LORES 0: PAPER 1: INK 7
15 FORZ=2TO22:PLOTO,Z,4:NEXT
20 GOSUB 300
30 PLOT 5,10, "OOOOO~: LET L=5 : LETL$="8888": LET D$="8"
40 LET S=L: LET T=S+S:: LET X=9: LET Y=T: LET N=0
50 LET G=INT(RND(1)*36)+1:LET H=INT(RND(1)*21)+2
60 IF SCRN(G,H)<>16ANDSCRN(G,H)<>32THEN50
110 PLOTG,H,CHR$(INT(RND(1)*9)+1+48):FORC=1TO15+INT(RND(1)*2*L)
120 IFN<1THENPLOTS,T," ":T=T +(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
125 IFN<1THENS=S-(LEFT$(L$,1)="8")+(LEFT$(L$,1)="5"):L$=MID$(L$,2)
130 LET Y=Y+(D$="7")-(D$="6"):LET X=X-(D$="8")+(D$="5")
132 LET Q=SCRN(X,Y): LET A$=CHR$(Q)
140 PLOT X,Y,"O":LET L$=L$+D$:IF A$>"0" AND A$<"A" THEN LET N=N+VAL
(A$)+1
145 IFA$>"0"ANDA$<"A"THENL=L+VAL(A$):C=15+2*L:PLOT24,0,STR$(L):ZAP:
GOTO160
150 IFA$<>CHR$(16)ANDA$<>CHR$(32)THEN200
~60 LET A$=KEY$: IF A$>"4" AND A$<"9" THEN LET D$=A$
165 IFN>0THENN=N-1
170 NEXTC:PLOTG,H,CHR$(32-47*(G=XANDH=Y)):GOTO50
200 EXPLODE
201 PLOT S,T," ": LET T=T+(LEFT$(L$,1)="7")-(LEFT$(L$,1)="6")
205 LET S=S-(LEFT$(L$,1)="8")+(LEFT$(L$,1)="5")
210 L$=RIGHT$(L$,LEN(L$)-1):IFL$<>""THEN201
215 PLOT 8,8,"PRESS  'R'  FOR ANOTHER"
216 PLOT 8,10,"PRESS  'S'  TO STOP"
220 IF KEY$="R" THEN RUN
230 IF KEY$<>"S" THEN GOTO 220
240 TEXT:CLS:LIST
300 REM BORDER
310 LORES 0
320 PLOT 1,0,"Snake              Score :- 5      "
330 PLOT 0,1,"**************************************"
340 FOR I=1 TO 22: PLOT 0,I,"*": PLOT 37,I,"*": NEXT I
350 PLOT 0,23,"**************************************"
360 RETURN
```

Illustration: Dorian Cross

Holy Moses! God has sure given me a tough task this time. I was sitting minding my own business, thinking holy thoughts, when there was this great clap of thunder, a flash of lightning, and this voice that filled my head until I thought it was going to burst!

The voice said, "I God, instruct you Moses to lead the Israelites away from Egypt to the Promised Land. But beware as the Pharoah will persue you with his armies and attempt to make you slaves again. Take the road towards the Red Sea and freedom.

I will help you provided no more than 2000 Israelites die on the journey. I have one miracle that I can use to aid your escape — but you must reach the Red Sea first. The Promised Land lies on the other side of this sea which you must cross.

Then you must take the Israelites to the place of the tablets, on which are engraved the Ten Commandments. Here you will be safe from the Egyptians and any other dangers."

So that's why we are trudging across these parched lands towards our Promised Land — with the Egyptian Pharoah's armies hot on our heels.



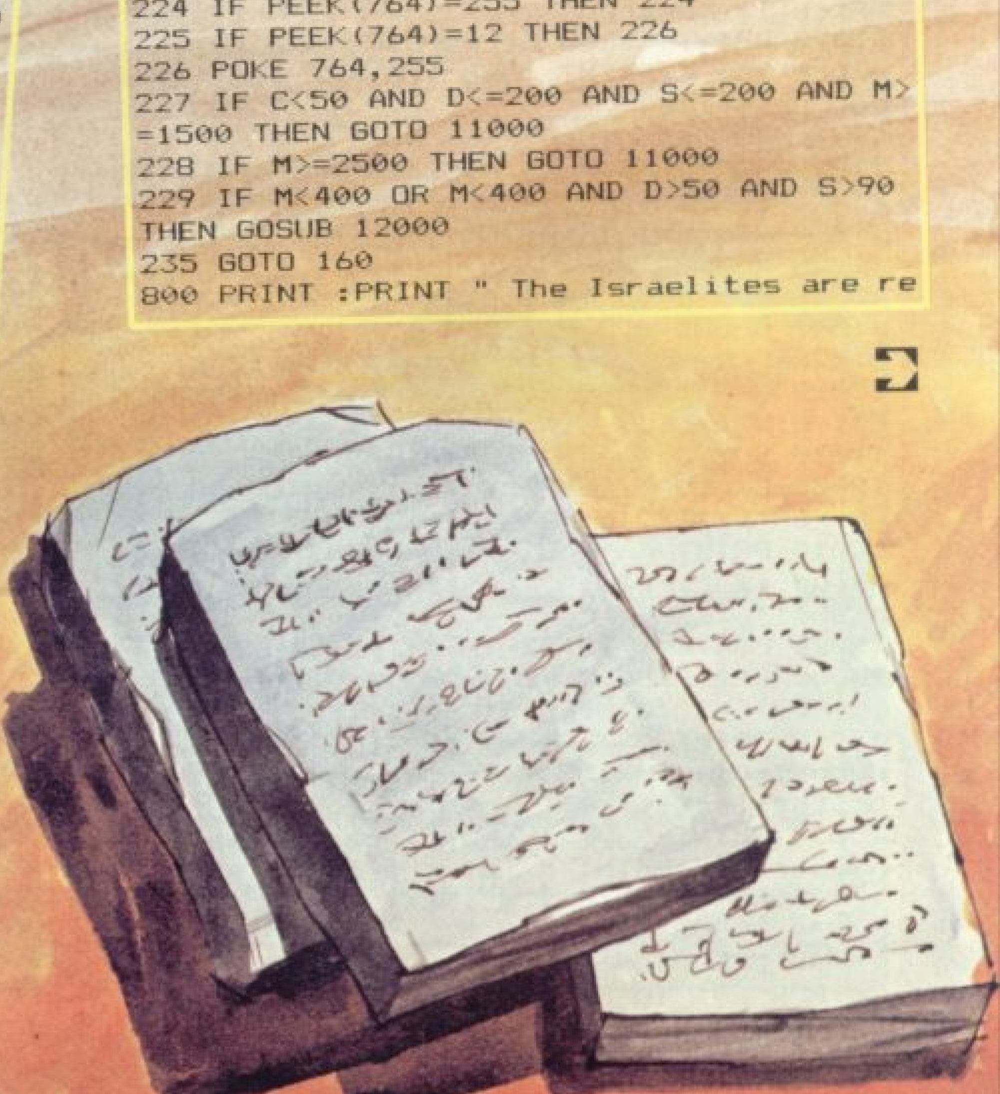
THE TEN COMMANDMENTS

RUNS ON AN ATARI 400/800 IN 5K

BY MARK BELL

```
7 GRAPHICS 1:SETCOLOR 2,0,0
8 POSITION 0,10:? #6;"the ten commandmen
ts"
9 FOR E=-10 TO 10
10 SOUND 0,200,4,10-ABS(E)
11 SOUND 1,255,4,10-ABS(E)
12 SOUND 2,225,4,10-ABS(E)
13 SOUND 3,150,4,10-ABS(E)
14 FOR K=1 TO 200:NEXT K:NEXT E:SOUND 0,
0,0,0:SOUND 1,0,0,0:SOUND 2,0,0,0:SOUND
3,0,0,0
15 DIM A$(30)
17 GOTO 100
18 FOR F=1 TO INT(19*RND(0))+1:READ A$:N
EXT F:RETURN
20 C=SQR(Q)*5
21 IF Q=1 THEN C=INT((Q*Q)-(INT(10*RND(0
))))
22 IF Q>1 AND Q<=2 THEN C=INT((Q*Q)-(INT
(10*RND(0))))
23 IF Q>2 AND Q<=3 THEN C=INT((Q*Q)-(INT
(10*RND(0))))
24 IF Q>3 AND Q<=4 THEN C=INT((50*RND(0)
)+Q*2)
25 IF Q>4 AND Q<=5 THEN C=INT((65*RND(0)
)+Q*2)
26 IF Q>5 THEN C=INT((99*RND(0))+Q*2)
27 RETURN
30 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0:
FOR E=1 TO 8:PRINT :NEXT E:PRINT " Thou
has failed me Moses...I saideth"
31 PRINT " to You not more than 2000 peo
ple ":PRINT " should die...";D+L;" peopl
e have died."
32 FOR E=1 TO 1550:NEXT E:PRINT " ...and
 so shall You.":FOR E=1 TO 999:NEXT E:GO
TO 830
33 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1:
FOR E=1 TO 10:PRINT :NEXT E:PRINT "    W
ould thou care to try again ?"
34 PRINT "              (Yay or Nay)":POKE
764,255
35 IF PEEK(764)=255 THEN 35
36 IF PEEK(764)=35 THEN PRINT :PRINT "
      THANKS FOR THE GAME.":POKE 764,25
5:POKE 752,0:END
37 POKE 764,255:RUN
90 PRINT " The people are unhappy becaus
e they ":PRINT "are hungry and fear deat
h or sickness.":RETURN
98 D=(D+L):IF D+L>2000 THEN 30
99 RETURN
100 I=INT(34000*RND(1))+9000
101 G=INT(9000*RND(1))+2000
```

```
102 D=INT(400*RND(1))+50
103 S=INT(420*RND(1))+20
104 Q=INT(10*RND(1))+5
105 M=INT(500*RND(1))+100
106 L=0:T=0
107 GRAPHICS 0:SETCOLOR 2,0,0:POKE 752,1
109 PRINT :PRINT :PRINT
110 PRINT " I God, instructeth You Moses
 to lead":PRINT " the Israelites away fr
om Egypt to"
112 PRINT "  safety. Beware as Pharoah p
ursueth":PRINT " after You with his armi
es."
115 PRINT "   If thou wouldeth to take t
he road":PRINT " to the Red Sea, I would
 lendeth my "
117 PRINT "  help provided not more than
 2000 ":PRINT "Israelites are killed. I
have but one"
118 PRINT "  miracle that You are free t
o use  ":PRINT " when You reach the Red
Sea. On the"
119 PRINT "  other side of the sea is th
e ":PRINT "    Promised Land."
120 PRINT "Take thou Israelites to the p
lace of ":PRINT "    the Ten Tablets with
 the Eternal "
122 PRINT " Commandments enscribed on th
em. ":PRINT "         Here thou will be saf
e."
125 PRINT :PRINT :PRINT "      PRESS [SPA
CE BAR] TO CONT.":POKE 764,255
126 IF PEEK(764)=255 THEN 126
127 IF PEEK(764)=12 THEN 128
128 POKE 764,255
160 IF Q<=0 THEN GOSUB 13000
162 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:PRINT :PRINT :PRINT :GOSUB 18
165 RESTORE
170 PRINT "There are ";I;" Israelites wi
th You.":PRINT :PRINT "You are passing t
he city of ";A$;"."
175 PRINT "The Egyptians are ";Q;:IF Q<=
1 THEN PRINT " day behind You";
176 IF Q>1 THEN PRINT " days behind You.
"
178 Q=Q-1
180 IF (D+S)>230 THEN GOSUB 90
182 IF D+L>=2000 THEN 30
185 GOSUB 20
190 PRINT " You're chance of succession
is ";INT(C);"%"
200 PRINT :PRINT " You have ";G;" tons o
f grain. How ":PRINT " much do You wish
to share amongst "
201 PRINT " the Israelites ";:INPUT Z
202 G=G-Z
203 IF G<=0 THEN GOSUB 830
204 IF Z<INT(G/(Q+1)) THEN GOSUB 800
205 FOR E=1 TO 6:PRINT :NEXT E:PRINT "
  PRESS [SPACE BAR] TO CONT.":POKE 764,2
55
206 IF PEEK(764)=255 THEN 206
207 IF PEEK(764)=12 THEN 208
208 POKE 764,255
210 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0,0
:GOSUB 18:PRINT :PRINT :PRINT "You are p
assing the town of ";A$;"."
211 RESTORE :IF M>=2500 THEN GOTO 11000
212 A=INT(250*RND(0))+100:W=INT(290*RND(
0))+50:IF Q<=0 THEN GOSUB 13000
213 PRINT :PRINT " The Egyptians are ";Q
;:IF Q<=1 THEN PRINT " day behind You.";
214 IF Q>1 THEN PRINT " days behind You.
"
215 T=INT(220*RND(0))+100
216 Q=Q-1:M=(M+T):I=I-(D+W)
217 PRINT :PRINT " You have travelled ";
M;" miles so far.":IF M>2500 THEN GOTO 1
1000
219 PRINT :PRINT " There are ";I;" Israe
lites with You.":PRINT :PRINT " You have
 ";G;" tons of grain."
220 PRINT :PRINT " ";(W)+D;" Israelites
have died.":PRINT :PRINT " ";(S)+A;" Isr
aelites are sick."
221 D=(D+W):S=(S+A):GOSUB 98
222 GOSUB 20:PRINT :PRINT " Your chance
of succession is ";INT(C);"%"
223 FOR E=1 TO 4:PRINT :NEXT E:PRINT "
  PRESS [SPACE BAR] TO CONT.":POKE 764,2
55
224 IF PEEK(764)=255 THEN 224
225 IF PEEK(764)=12 THEN 226
226 POKE 764,255
227 IF C<50 AND D<=200 AND S<=200 AND M>
=1500 THEN GOTO 11000
228 IF M>=2500 THEN GOTO 11000
229 IF M<400 OR M<400 AND D>50 AND S>90
THEN GOSUB 12000
235 GOTO 160
800 PRINT :PRINT " The Israelites are re
```



```
volting!!":PRINT :PRINT " They need more
 food."
810 GOSUB 20:GOTO 190
830 FOR E=1 TO 8:PRINT :NEXT E:PRINT " T
here is no more grain left. ":PRINT " Th
e Israelites will starve - You "
835 PRINT " have failed me Moses!":PRINT
 :PRINT " You must suffer the consequenc
es."
840 FOR E=1 TO INT(990*RND(1))+500 STEP
10
842 SETCOLOR 2,E,E
843 SETCOLOR 2,10,E
844 SOUND 1,255,E,6
845 SOUND 2,E,8,5
846 NEXT E
847 SOUND 1,0,0,0:SOUND 2,0,0,0:SETCOLOR
 2,0,0
848 FOR E=1 TO 1000:NEXT E:GOTO 33
9050 DATA Damascus
9051 DATA Beersheba
9052 DATA JUDAEA
9053 DATA Bethlehem
9054 DATA Sidon
9055 DATA Nazareth
9056 DATA Cana
9057 DATA Jericho
9058 DATA SAMARIA
9059 DATA Jordan
9060 DATA GALILEE
9061 DATA Capernaum
9062 DATA Tyre
9063 DATA Joppa
9064 DATA Tiberias
9065 DATA Bethany
9066 DATA Gadara
9067 DATA JERUSALEM
9068 DATA Caesarea
9069 DATA Lama
11000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0
,0:FOR E=1 TO 8:PRINT :NEXT E
11010 PRINT " Thou has done well Moses i
n reaching":PRINT " the Red Sea so soon.
..I will reward "
11020 PRINT "thee by parting the ocean b
efore You ":PRINT " so You can pass thro
ugh unharmed."
11021 FOR L=1 TO P
11022 FOR J=0 TO 45 STEP 2
11023 SOUND 0,J,8,4
11024 FOR K=1 TO 20+RND(0)*10:NEXT K
11025 NEXT J
11026 FOR J=45 TO 0 STEP -2
11027 SOUND 0,J,8,4
11028 FOR K=1 TO 50+RND(0)*30:NEXT K
11029 NEXT J:FOR K=1 TO 300+RND(0)*300:N
EXT K:NEXT L
11030 SOUND 0,0,0,0:GOTO 14000
12000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0
,0:FOR E=1 TO 8:PRINT :NEXT E
12010 PRINT " Thou better buck their ide
as up if ":PRINT "     thou wanteth to fi
nish!!"
12020 FOR E=1 TO 520:NEXT E:RETURN
13000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0
,0:FOR E=1 TO 8:PRINT :NEXT E
13010 PRINT "   Moses the Egyptians are
upon You!!":PRINT " Thou has failed me f
or the last time"
13020 PRINT " ...I shall leave thee to t
he mercy ":PRINT "  of the Egyptians."
13025 FOR E=1 TO 1200:NEXT E
13030 GOSUB 840:GOTO 33
14000 GRAPHICS 0:POKE 752,1:SETCOLOR 2,0
,0:FOR E=1 TO 6:PRINT :NEXT E
```



```
14005 V=INT(8*RND(0))+1
14010 IF Q=1 THEN PRINT "   Thou must hur
ry as the Egyptians ":PRINT " are less t
han a day away."
14015 IF D<=1400 THEN PRINT " Thou have
crossed the sea with only ";V;"  deaths.
":I=I-V
14020 IF D>1600 THEN PRINT " The Egyptia
ns are upon thee. Thou ":PRINT " has fai
led me...You will ";
14025 IF D>1600 THEN PRINT "drown with
  the rest of your followers.":GOSUB 840
:GOTO 33
14032 PRINT "    Thou is now in the Promi
sed Land."
14034 PRINT " ";I;" followers have cross
ed safely":PRINT " with thee and await f
or the final ":PRINT "   journey."
14036 IF D>1400 AND D<=1600 THEN PRINT "
 Thou is not out of danger yet as ":PRIN
T " most of the Egyptian";
14038 IF D>1400 AND D<=1600 THEN PRINT "
 army got through and are following thee
 once again."
14039 IF V<4 THEN POKE 752,1
14040 IF V<4 THEN PRINT " The Egyptians
are here!!...There is"
14042 IF V<4 THEN PRINT " nothing we can
 do...They have us!":GOSUB 840:GOTO 33
14050 IF V>=4 THEN POKE 752,1
14052 PRINT " Thou has only ";INT(V^2);"
 miles to go.":PRINT " ";V*2;" people ha
ve died since crossing."
14053 GOSUB 14090
14054 IF V>=4 THEN I=I-INT(V*2):D=D+(V*2
):GOSUB 98
14055 IF D<=1982 AND V<25 THEN PRINT :PO
SITION 16,19:PRINT " MOSES!!"
14056 IF D<1982 AND V<25 THEN PRINT " MO
SES!!...Thou has made it to the ":PRINT
" place of the TEN COMMANDMENTS."
14057 X=INT(((I*G)+(Q*V)-(D*S))/100000)
14060 PRINT :PRINT :PRINT "  Thou scored
 ";X;" points."
14070 PRINT :PRINT "        PRESS [SPACE B
AR] TO RET.":POKE 764,255
14072 IF PEEK(764)=255 THEN 14072
14074 IF PEEK(764)=12 THEN 14076
14076 POKE 764,255:GOTO 33
14090 FOR Y=0 TO 30:FOR P=1 TO 3 STEP 2
14091 NEXT P
14092 FOR P1=1 TO 5
14093 IF P1=2 THEN GOSUB 9000
14094 FOR DF=1 TO 15:NEXT DF
14095 NEXT P1
14096 NEXT Y
14099 RETURN
```



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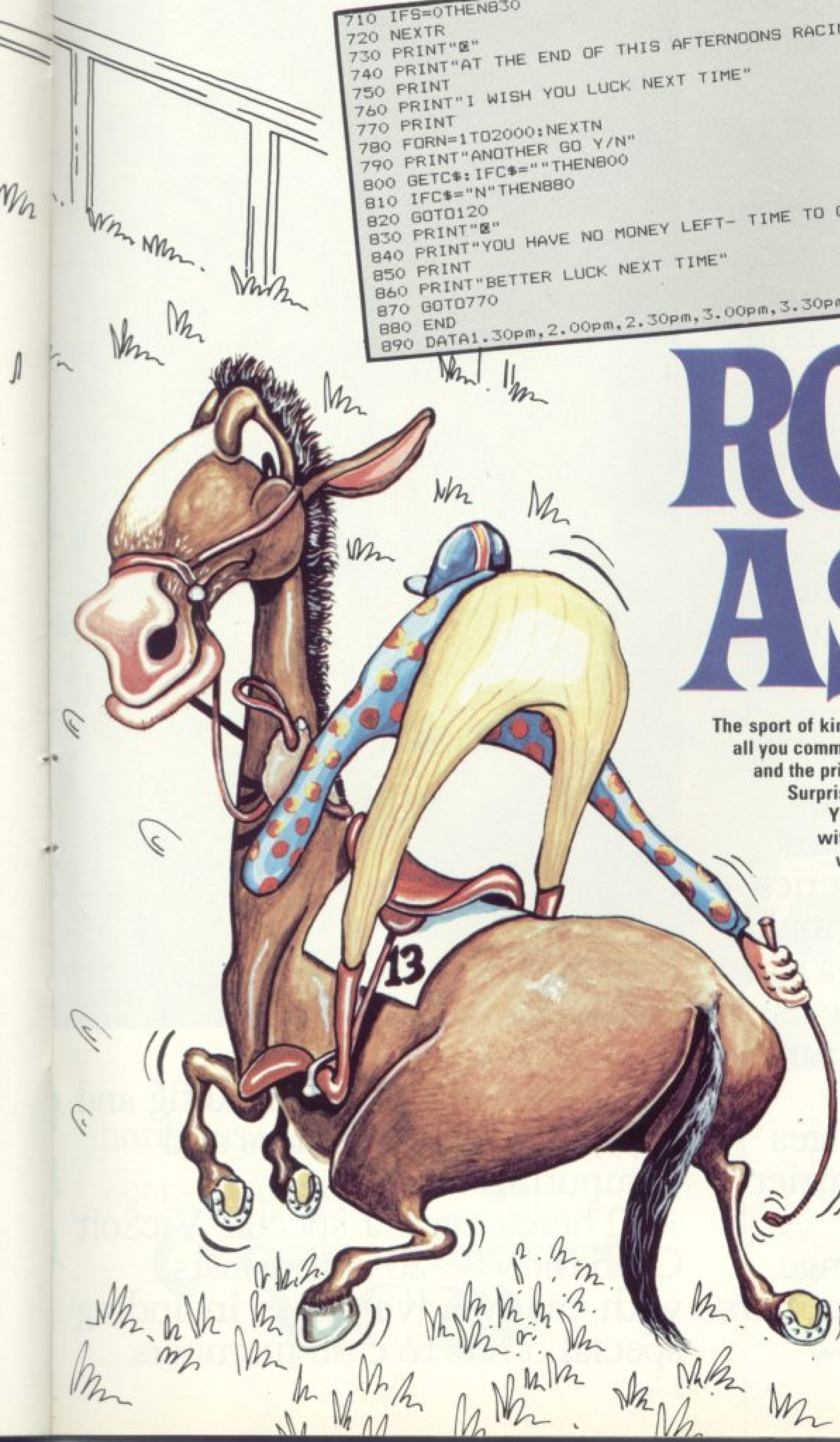
```
10 PRINT"■"
20 DIMR$(6),A(9,2),G(9),HA(9)
30 FORN=1TO6:READR$(N):NEXTN
40 PRINT"WELCOME TO ROYAL ASCOT"
50 PRINT
60 PRINT"THERE ARE SIX RACES ON THE CARD THIS     AFTERNOON"
70 PRINT
80 PRINT"YOU HAVE £50 AND INTEND TO BREAK THE     BOOKIES"
90 PRINT
100 PRINT"PRESS C TO CONTINUE"
110 GETC$:IFC$="C"THEN120
115 GOTO110
120 S=50
130 FORR=1TO6
140 PRINT"■"
150 RU=INT(RND(1)*7)+3:Z=53648
160 PRINT"THERE ARE";RU;" RUNNERS IN THE ";R$(R)
170 PRINT
180 PRINT"THE ODDS ARE:-"
190 PRINT
200 FORN=1TORU
210 X=INT(RND(1)*19)+1:Y=INT(RND(1)*4)+1
220 P=X/Y:IFP-INT(P)=0THENX=P:Y=1:GOTO240
230 P=X/2:Q=Y/2:IF(P-INT(P)=0)*(Q-INT(Q)=0)THENX=P:Y=Q
240 A(N,1)=X:A(N,2)=Y
250 HA(N)=.5-Y/X*.2:IFHA(N)<.2THENHA(N)=.2
260 PRINT"No.";N,X;" /";Y
270 NEXTN
280 PRINT
290 PRINT"YOU HAVE £";S
300 PRINT
310 INPUT"WHICH HORSE DO YOU SELECT ";E
320 IF(E<1)+(E>RU)THEN310
330 PRINT
340 INPUT"HOW MUCH DO YOU WISH TO STAKE ";F
350 IFS-F<0THEN340
360 S=S-F
370 PRINT"■"
380 POKE4466,5:POKE4465,38:PRINT"■■■|■■|■■|"
390 PRINT"________________________________________"
400 POKE4466,10:POKE4465,38:PRINT"%1■■■%2■■■%3■■■%4■■■%5■■■%6■■■%7■■■%8■■■%9";
410 PRINT"________________________________________"
420 PRINT"■■■YOU HAVE £";F;" ON No.";E;" AT";A(E,1);" /";A(E,2)
430 PRINT"■■■■■THEY'RE COMING TO THE START NOW"
440 FORN=1TO1000:NEXTN
450 FORN=1TORU
460 POKEZ,120:G(N)=Z:Z=Z+40
470 NEXTN
480 V=(INT(RND(1)*5)+1)*1000
490 PRINT"■■■■■THEY'RE UNDER STARTERS ORDERS      "
500 FORN=1TOV:NEXTN
510 PRINT"■■■■■AND THEY'RE OFF                    "
520 MUSIC"_B"
```

BY A. R. HEAD

RUNS ON A SHARP MZ80K IN 2.5K

```
530 FORN=1TORU
540 J=RND(1):IFJ<HA(N)THEN570
550 G(N)=G(N)+1:T=PEEK(G(N)):IFT>0THEN600
560 POKEG(N),120:POKEG(N)-1,0
570 NEXTN
580 GOTO530
600 MUSIC"¯BB¯BB"
610 POKEG(N),120:POKEG(N)-1,0
620 PRINT"▒▒▒▒▒THE WINNER WAS No.";N;" AT";A(N,1);" /";A(N,2)
630 POKE4466,20
640 IFE<>NTHENPRINT"HARD LUCK":GOTO680
650 W=INT(A(N,1)*F/A(N,2))
660 PRINT"YOU HAVE WON £";W
670 S=S+W+F
680 PRINT
690 PRINT"PRESS C TO CONTINUE"
700 GETC$:IFC$="C"THEN710
705 GOTO700
```

```
710 IFS=0THEN830
720 NEXTR
730 PRINT"⊠"
740 PRINT"AT THE END OF THIS AFTERNOONS RACING    YOU HAVE £";S
750 PRINT
760 PRINT"I WISH YOU LUCK NEXT TIME"
770 PRINT
780 FORN=1TO2000:NEXTN
790 PRINT"ANOTHER GO Y/N"
800 GETC$:IFC$=""THEN800
810 IFC$="N"THEN880
820 GOTO120
830 PRINT"⊠"
840 PRINT"YOU HAVE NO MONEY LEFT- TIME TO GO HOME"
850 PRINT
860 PRINT"BETTER LUCK NEXT TIME"
870 GOTO770
880 END
890 DATA1.30pm,2.00pm,2.30pm,3.00pm,3.30pm,4.00pm
```



ROYAL ASCOT

The sport of kings, that's what they call horse racing. Well, now all you commoners out there can get a look in at Royal Ascot — and the price of admission is just the same as this magazine. Surprising huh?

You arrive at Ascot at the start of the day's racing with just £50 in your pocket and a burning desire to win at least £1,000. It is possible to win £6,000 plus — but that isn't easy!

Before each race you are given a list of runners and their odds. The odds are a realistic representation of the chances of winning — but there are no dead certs and the favourite doesn't always win. In a large field a long odds outsider might come romping home.

Program notes:

Line 150 decides how many runners in the race and resets Z to the screen address of the starting position of the first runner.

Line 210 selects the odds.

Lines 220, 230 reduce the odds to the lowest denominator.

Line 250 handicaps the horse according to its odds.

530-580, the race is run between these lines. The Peek in 550 checks if a horse has finished.

POKE 4466, X — print X lines down.

POKE 4465, Y-print Y columns in.

Illustration: Dorian Cross

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to add to your understanding and enjoyment of computers and computing.

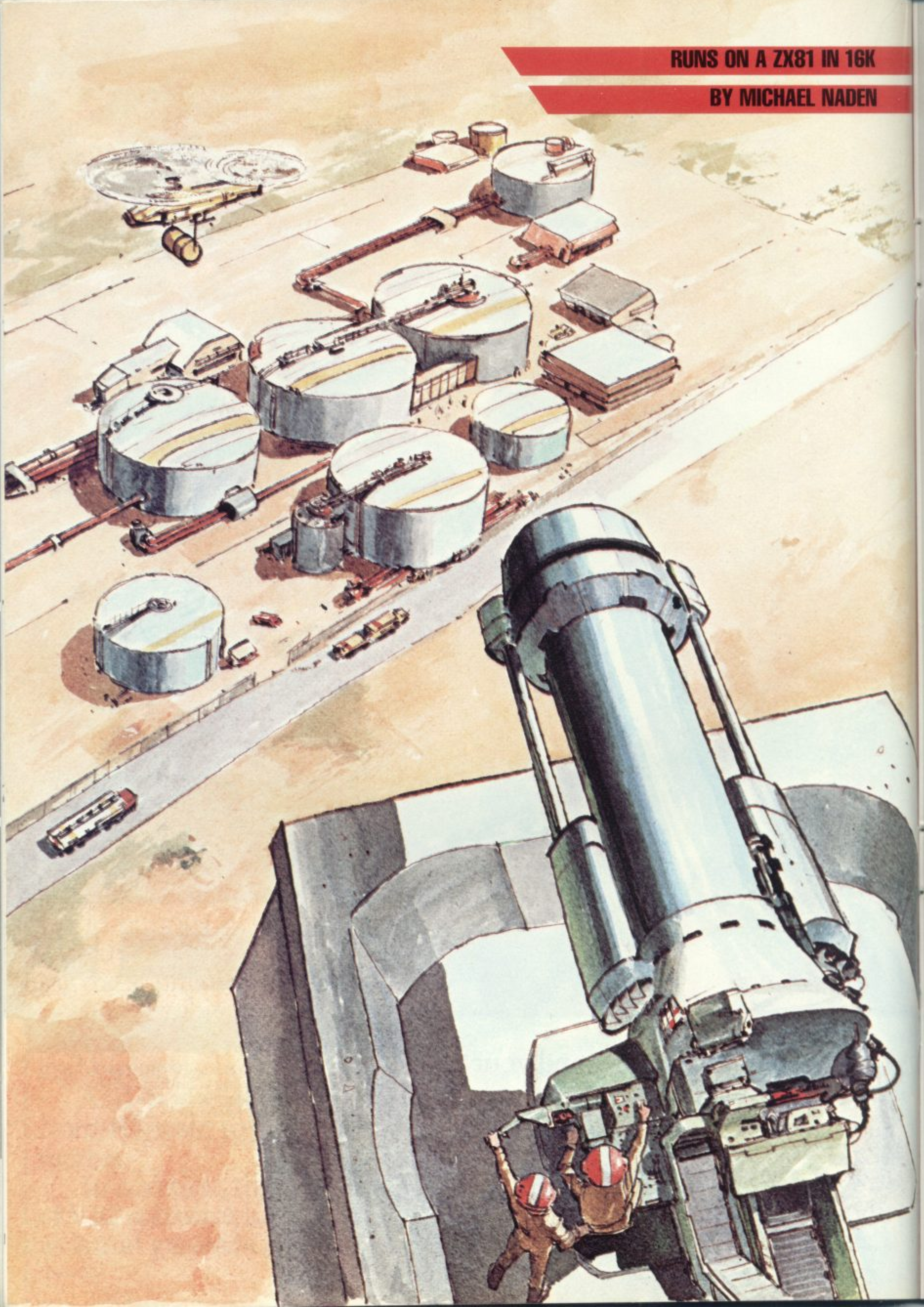
There's even a special 'VicSoft' Club for VIC 20 enthusiasts, with many advantages including special offers to club members.

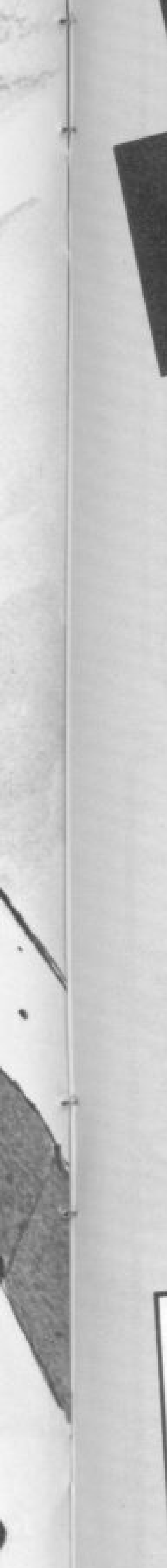


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RUNS ON A ZX81 IN 16K

BY MICHAEL NADEN





CANNON MASTER

You perch like some sinister bird high atop a tall and graceful battle-tower waiting for the next attack — which you know will come all too soon. The enemy is determined to destroy your fuel supplies and only you — and commander of two battle-towers which defend a blasted plateau which serves as a fuel-supply depot for your armed forces — can protect the valuable stockpile.

Will you be able to beat off the alien attack? Or will the invaders destroy you and your planet?

Once you have programmed in this life and death struggle you will see two towers appear on the screen. The '+' signs at the bottom of the screen mark the locations of the fuel supplies which you have to protect.

There are three cannons in each of the towers which remain hidden until fired at the advancing aliens. The laser blast from each cannon will reach halfway across the screen. To make the game harder you have limited power for your cannons. If you find they do not fire you must wait a few seconds for them to recharge.

Also the aliens can destroy your weapons — but will not be harmed themselves. They can only be destroyed by a direct hit or a collision with one of the towers.

Once two fuel-dumps are destroyed by the invaders the game is over.

The controls:

Keys 1, 2, 3, 4, or 5 fire top left cannon. Keys Q, W, E, R or T fire middle left cannon. Keys A, S, D, F or G fire bottom left cannon.

Keys 6, 7, 8, 9 or 0 fire top right cannon. Keys Y, U, I, O or P fire middle right cannon. Keys H, J, K, L or N/L fire bottom right cannon.

```
 10 LET U=0
 20 POKE 16418,0
 30 SLOW
 40 LET C=16514
 50 LET S=0
 60 PRINT AT 0,0;
 70 FOR A=1 TO 24
 80 PRINT "████████████████████████████████"
 90 NEXT A
100 LET P=50
110 LET J=6
120 FOR A=1 TO 15
130 PRINT AT A,4;"▒▒▒▒▒▒";TAB 22;"▒▒▒▒▒▒"
140 NEXT A
150 FOR A=1 TO 4
160 PRINT TAB 4;"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒"
170 NEXT A
180 LET Z=1+PEEK 16396+256*PEEK 16397
190 LET A=Z+INT (RND*13)+8
200 LET B=Z+INT (RND*13)+8
210 PRINT AT 16,12;"++++++"
220 POKE A,128
230 LET P=P+2.5
240 LET A=A+INT (RND*3)+32
250 IF PEEK A=8 THEN GOSUB 540
260 IF PEEK A=149 THEN GOSUB 680
270 POKE A,151
280 IF PEEK 16421<>255 THEN GOSUB 360
290 POKE B,128
300 LET B=B+INT (RND*3)+32
310 IF PEEK B=8 THEN GOSUB 540
320 IF PEEK B=149 THEN GOSUB 680
330 POKE B,151
340 IF PEEK 16421<>255 THEN GOSUB 360
350 GOTO 220
360 LET Q=PEEK 16421
370 PRINT AT 22,1;"████████"
380 IF P<0 THEN PRINT AT 22,1;"NO POWER"
390 IF P<0 THEN RETURN
400 LET P=P-10
410 LET C=Z+139*(Q=247)+238*(Q=251)+337*(Q=253)+220*(Q=239)+319*(Q=223)+418*(Q=191)
420 LET D=(Q>=247 AND Q<=253)-(Q>=191 AND Q<=239)
430 IF PEEK C=128 THEN RETURN
440 LET N=C
450 POKE C,(146*(D=1)+147*(D=-1))
460 FOR C=N+D TO N+(7*D) STEP D
470 IF PEEK C=151 THEN GOTO 540
480 POKE C,150
490 NEXT C
500 FOR X=N+D TO C STEP D
510 POKE X,128
520 NEXT X
530 RETURN
540 IF PEEK C=151 THEN LET H=C
550 IF PEEK C=151 THEN LET S=S+10
560 IF PEEK A=8 THEN LET H=A
570 IF PEEK B=8 THEN LET H=B
580 FOR I=1 TO 5
590 POKE H,23
600 FOR F=1 TO 1000
610 POKE H,151
620 NEXT I
630 POKE H,128
640 IF H=A THEN LET A=Z+INT (RND*14)+9
650 IF H=B THEN LET B=Z+INT (RND*14)+9
660 IF H=C THEN GOTO 500
670 RETURN
680 LET I=155
690 IF PEEK A=149 THEN LET H=A
700 IF PEEK B=149 THEN LET H=B
710 POKE H,I
720 POKE H-32,I
730 POKE H-34,I
740 POKE H-63,I
750 POKE H-69,I
760 POKE H-29,I
770 POKE H-37,I
780 IF I=128 AND J=4 THEN GOTO 830
790 IF I=128 THEN GOTO 640
800 LET I=128
810 LET J=J-1
820 GOTO 710
830 PRINT AT 21,1;"YOU SCORED ";
840 LET S$=STR$ S
850 FOR L=1 TO LEN S$
860 PRINT CHR$ (CODE S$(L)+128);
870 NEXT L
880 PRINT " POINTS"
890 IF S$=STR$ U THEN GOTO 940
900 IF S>U THEN LET U=S
910 PRINT AT 22,1;"HIGH SCORE IS ";
920 LET S$=STR$ U
930 GOTO 850
940 IF INKEY$<>"" THEN GOTO 940
950 PRINT AT 9,9;"HIT ANY KEY"
960 FOR F=1 TO 100000
970 PRINT AT 9,9;;"HIT ANY KEY"
980 IF INKEY$="" THEN GOTO 950
990 GOTO 20
```

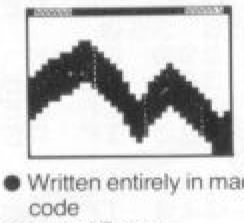
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An Exciting range for 16K ZX81 from SOFTWARE FARM

SUPER SCRAMBLE

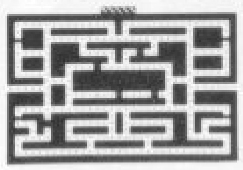
YOUR MISSION
To penetrate the witches defences, enter her cavern and destroy her wicked heart.

THE WITCHES DEFENCES
Stalagmites and stalactites - which grow across your path.
Volcanoes - to get past alive - if you can!
Vampire Bats - that cling to your ship and make controls sluggish
Cave-ins - should you hit the side of the cave with your Laser Cannon or Bomb, part of the roof will cave in on you



- Written entirely in machine code
- Hall of Fame
- 1 or 2 players
- Mystery score positions to bomb
- 5 skill levels

GOBBLERS Mk 2



Beat that high score!
Gobble those dots before those meanies gobble you!
Your only aids are four 'Power Pills' which make the meanies edible. But not for long!

- Machine coded for fast action
- Extra 'Gobbler' for 10,000 points
- On screen scoring
- High score with enter name facility
- Up to 4 players

Improved Mk 2 version!

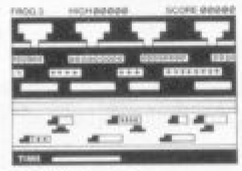
ASTEROIDS

Stay alive as long as possible in open space filled with flying rocks. Score by shooting them - which also causes them to break into lots of little bits and makes life even worse!

- Machine coded for fast action
- On screen scoring
- High score with enter name facility
- Up to 4 players
- Extra ship for 1,000 points (not as easy as it sounds!)
- Ship moves just like arcade version
- Rotate left/rotate right/thrust
- Fires in all 8 directions
- Increasing number of asteroids
- Three asteroid sizes
- alien spaceship (fires back!)

All games £5.95 each

NEW! FROG HOPPER



Jump your frog over the lanes in the road - preferably without being turned into jam by the approaching traffic! Then cross the river by hitching a few rides on some passing logs and finally into the safety of your hole on the opposite bank. Once all 'Frog Holes' have been filled you start again with a different pattern and a bonus frog.

- 50 Skill levels!
- Played against the clock - froggie only has a short while to live!

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C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working, would be of great help to beginners. Please make sure that your name, address and the program name is on everything you send us, including the cassette itself.

This form will merely help us to keep a check on your game as it goes through our testing process and make sure we have all the information we need to present it properly in the magazine.

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on.

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

Program name: ....

Machine make: .... Model ....

Other models it should run on: .... Number of K needed to run it: ....

Other equipment (joysticks, Extended Basic, add ons, etc.) needed to run it: ....

Author's Christian name: .... Surname: ....

Address: ....

....

.... Tel: .... Date: ....

Type of game: (If original please say so) ....

Loading instructions: ....

Game instructions: (If not included in the listing) ....

....

....

Office use only

Date received: ....

Acknowledgement sent: ☐

Name of evaluator: ....

Date sent out: ....

Date due back: ....

Needs to be returned to author for alterations: ☐ Date sent: ....

Due to be published in issue of magazine. ....

Evaluator's comments

Good enough to publish ☐

Needs some tidying up ☐

Not worth publishing ☐

Same game already published on this micro ☐

Wouldn't load ☐

LOOK FOR THE ULTIMATE SIGN FOR THE ULTIMATE GAMES



PSSST for 16 or 48K SPECTRUM

Little vermin, leave my plant alone, Oy! My plant's dying. No! No! Nasty bugs sucking the life from my Thyrgodian Megga Chrisanthodil, making her shrink, wilt and die. I'll soon put a stop to their little game; quick Spray-O. This'll sort 'em out, there! Take that and that. Ha! Ha! Mustn't die, mustn't die. It's got to flower, it must do. It said on the packet, "Takes between two and five minutes to grow". It can't be much longer, won't be long now. Why! you little, little . . . Quickly, get the super space slug spray, and then the leech laser. Quick, Quick. They breed so fast, can't hold them back for long. Hurry! . . . Hurry! . . . Arrggg! . . .

PSSST . . . The ULTIMATE Challenge.

PSSST Arcade standard, 100% machine code, incredible sound effects, amazing smooth high resolution visual graphics, and that totally new addictive concept and all those features you come to expect from the ULTIMATE GAME people.

Now you know why 'ULTIMATE PLAY THE GAME'

PSSST . . . Go grow yourself a REAL game.

Design: 'ULTIMATE PLAY THE GAME'

JET PAC for 16 or 48K SPECTRUM

The 'Acme Interstellar Transport Company' is delivering Spaceship kits to various planets throughout the Galaxy, and as chief test pilot, all you have to do is assemble the Rockets and thrust on to your next destination.

But as you don't often get the chance of a free trip across the Galaxy and space travel is, oh, so expensive, now's your chance to get rich! You might just as well stop off on several planets on your journey, collect the odd sack of precious gems, elements or gold, and take them back with you.

Upon landing, you will find yourself equipped with the very latest Hydrovac **JET PAC**, plus megga powerful, Quad Photon Laser Phasers, to blast any nasty, mean, little aliens who might object to your visit. And my! do those aliens get upset when you collect all of their valuables, and sneak off, without so much as a by-your-leave.

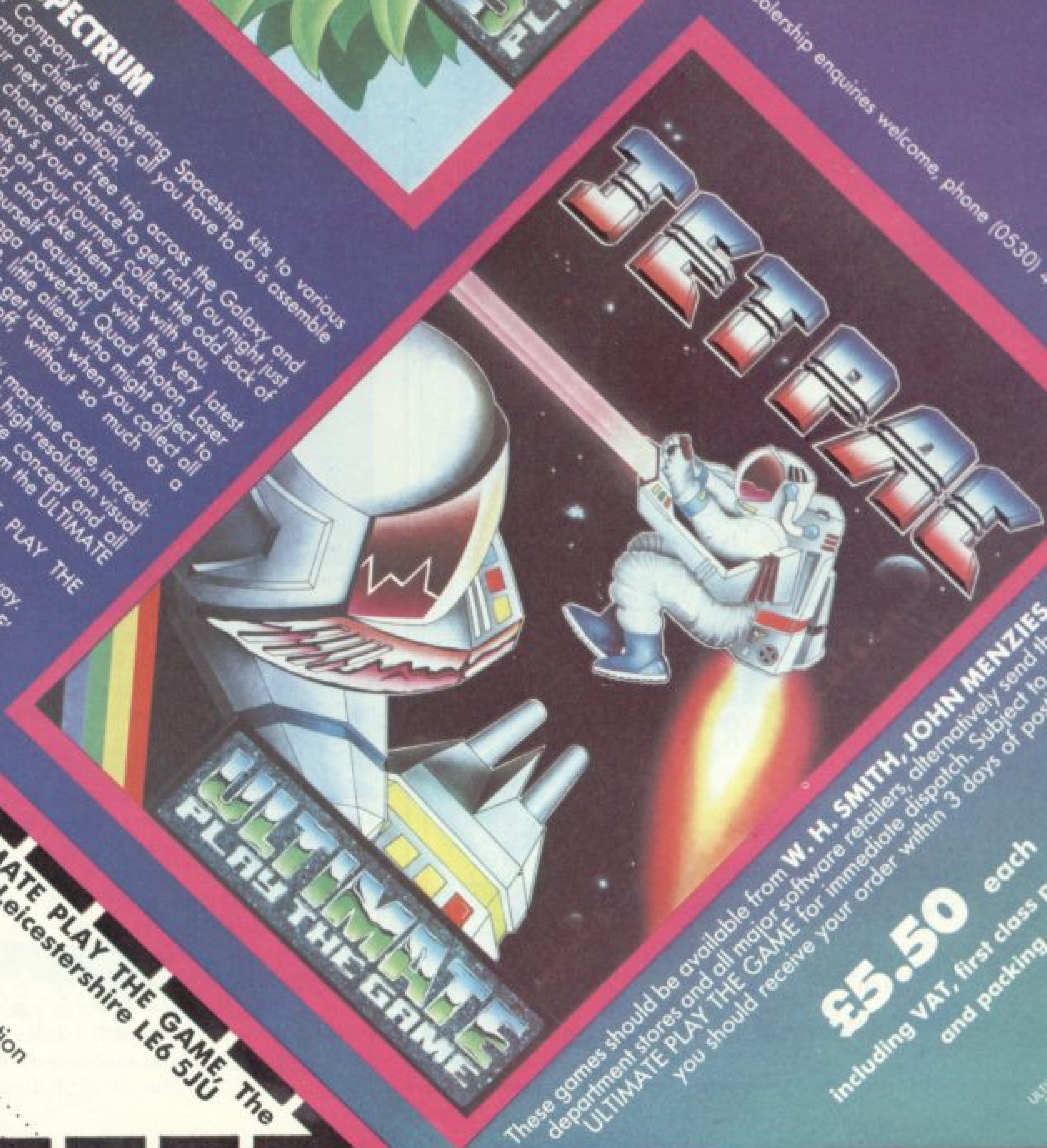
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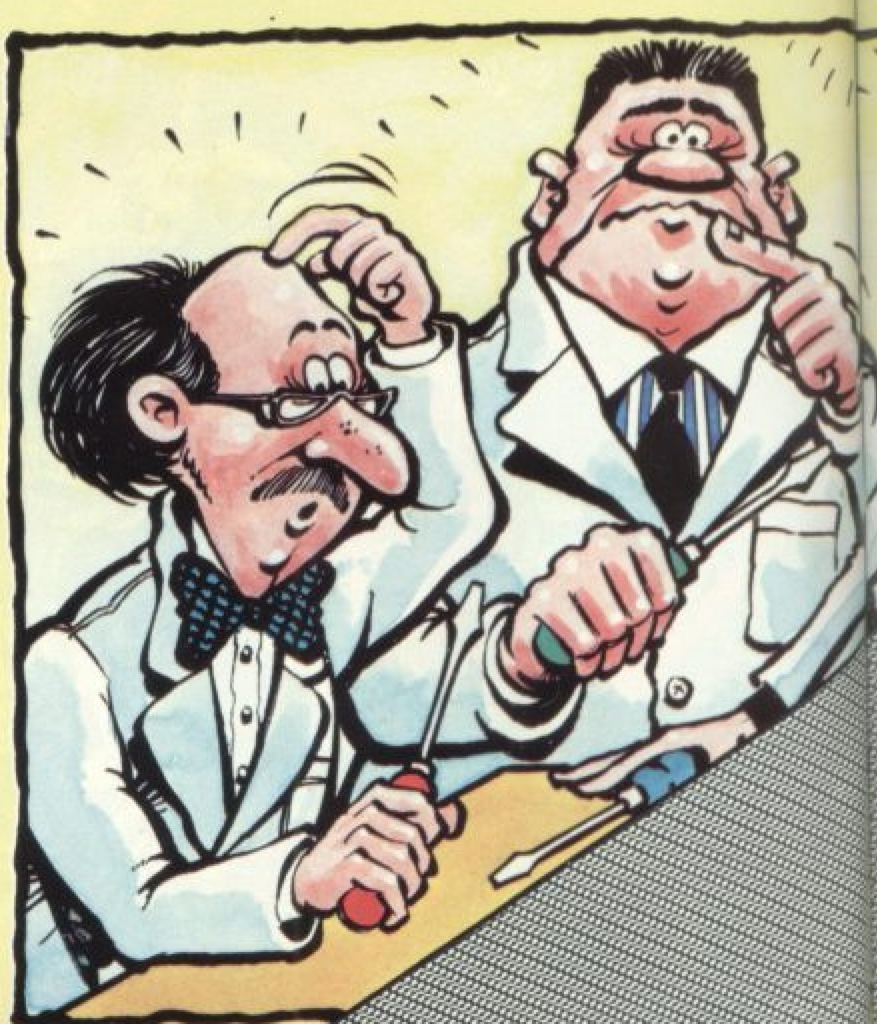
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THE BLACK BOX

```
   9 REM
          MINI BLACK BOX
          by J.S.Heppell
             19-02-83
  10 DIM v(5): DIM w(5): DIM x(5
: DIM y(5)
  20 POKE 23609,5
  30 GO TO 2800
  39 REM absorption noise
  40 FOR b=0 TO 12
  50 BEEP .01,12
  60 NEXT b
  70 LET p$="absorbed"
  80 INVERSE 1
  90 GO TO 1200
  99 REM deflection noise
 100 FOR b=12 TO 14 STEP .2
 110 BEEP .01,b
 120 NEXT b
 130 FOR b=24 TO 26 STEP .2
 140 BEEP .01,b
 150 NEXT b
 160 LET p$="deflected"
 170 GO TO 1240
 179 REM reflection noise
 180 FOR b=0 TO 12
 190 BEEP .01,b
 200 NEXT b
 210 FOR b=11 TO 0 STEP -1
 220 BEEP .01,b
 230 NEXT b
 240 LET p$="reflected"
 250 GO TO 1200
 259 REM straight noise
 260 FOR b=24 TO 28 STEP .2
 270 BEEP .01,b
 280 NEXT b
 290 LET p$="straight"
 300 GO TO 1240
 309 REM clear ray description
area
 310 FOR r=7 TO 11
 320 PRINT AT r,0;"
 330 NEXT r
 340 RETURN
 349 REM
       initialise for new game
 350 LET paper=0: LET ink=2
 360 LET currow=18: LET curcol=1
3
 370 LET peg=0: LET right=0
 379 REM input and check number
of pegs
 380 INPUT TAB (5);"How many peg
s(4/5)?";i$
 390 IF LEN (i$)>1 THEN GO TO 38
0
 400 IF CODE (i$)<52 OR CODE (i$
)>53 THEN GO TO 380
 410 LET nopeg=VAL (i$)
 420 IF ATTR (0,0)=122 THEN GO S
UB 2650: GO SUB 2490
 429 REM randomly position pegs
and check that all are
differently positioned
 430 RANDOMIZE
 440 FOR n=1 TO nopeg
 450 LET v(n)=INT (RND*8+1)
 460 LET w(n)=INT (RND*8+9)
 470 FOR d=n-1 TO 1 STEP -1
 480 IF v(n)=v(d) AND w(n)=w(d)
THEN LET n=n-1: GO TO 500
 490 NEXT d
 500 NEXT n
 510 FOR n=1 TO nopeg
 520 LET x(n)=v(n)+16
 530 LET y(n)=w(n)+16
 540 NEXT n
 549 REM
          Normal mode
 550 LET deflec=0
 559 REM input and check guess
 560 INPUT TAB (6);"Your guess(0
-32)?";i$
 570 IF CODE (i$)<48 OR CODE (i$
)>57 THEN GO TO 550
 580 IF VAL (i$)<0 OR VAL (i$)>3
2 THEN GO TO 550
 590 IF VAL (i$)=0 THEN GO TO 15
20
```

```
 600 PAPER 7: INK 2
 610 GO SUB 310
 620 LET entry=VAL (i$)
 630 GO SUB 1480
 640 IF ATTR (erow,ecol)=71 THEN
GO TO 720
 649 REM display warning if
entry square already used
 650 PRINT AT 7,3-(LEN (i$)-1);e
ntry;" -"
 660 PRINT AT 9,1;"already"
 670 PRINT AT 11,2;"used"
 680 FOR b=1 TO 5
 690 BEEP .05,36
 700 NEXT b
 710 GO TO 550
 719 REM tell player that ray
path being plotted
 720 PRINT AT 7,0;"Plotting"
 730 PRINT AT 9,0;"course of"
 740 PRINT AT 11,0;"ray now.."
```

Illustration: Terry Rogers



RUNS ON A SPECTRUM IN 48K

BY JEREMY HEPPELL

Dare you delve into the Black Box and decipher its hidden secrets? This is a challenging game of deduction in the Mastermind mode.

Your Spectrum will create a code which you have to crack. The code takes the shape of four pegs hidden in an eight by eight grid — the "black box".

You have to attempt to crack the code by sending in "rays" from the edges of the box. These rays always travel in a straight line — unless they hit a peg. When this happens you'll get a clue to the wherabouts of the hidden pegs.

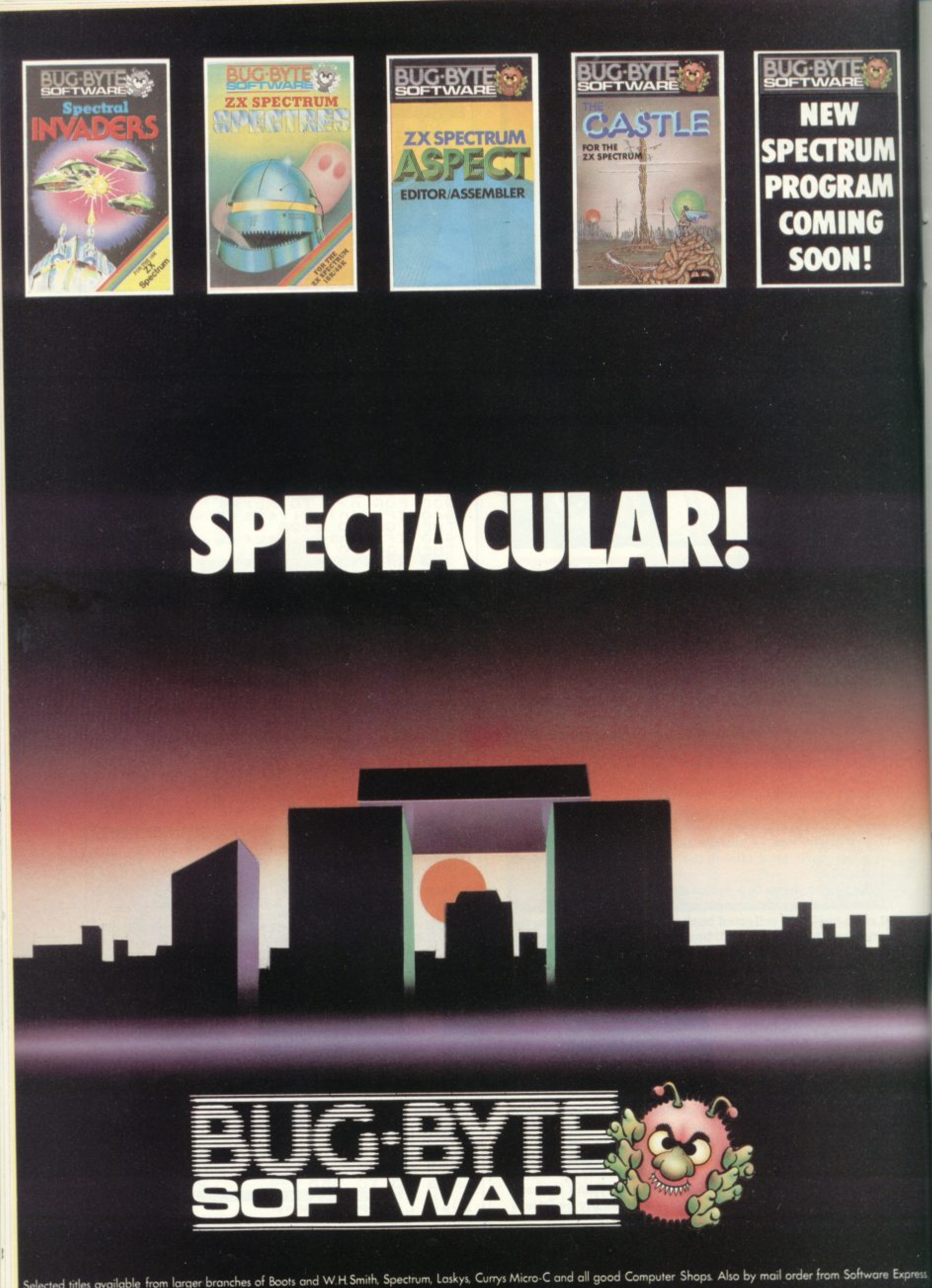
The rays behave in a completely logical fashion. When they strike a peg the ray will either be absorbed, deflected at right angles or reflected back the way it came. From the actions of the rays you will be able to deduce the positions of the pegs. But beware some rays will follow long and tortuous routes which can be baffling!

When the game begins you are in normal mode, where you fire rays in from the outside edges of the box. When you think you know the location of any, or all, the pegs, type 0 and you will enter cursor mode. Using the controls listed on the screen you plot the pegs which you think you have found. When you reckon that you know the positions of all the pegs type in 9 (in cursor mode) and the computer will mark your final guess.

Because of the limitations of Basic the computer will sometimes take several seconds to work out a ray path.

For those of you with stiff programming fingers the title pages at the end of the listing can be left out. You must however, leave in the lines which read the user-defined graphic characters. Remember that when typing in these user-defined graphic the characters will simply be letters in graphics mode — I used A, B, C, and D.

```
 750 PRINT PAPER 0; INK 7; FLASH
 1;AT erow,ecol;"A"
 759 REM set variables used in
plotting ray path
 760 LET direct=entry
 770 IF direct<=8 THEN LET start
=9: GO TO 810
 780 IF direct<=16 THEN LET star
t=17: GO TO 810
 790 IF direct<=24 THEN LET star
t=32: GO TO 810
 800 LET start=8
 810 IF start<=8 THEN LET end=1:
 GO TO 850
 820 IF start<=16 THEN LET end=1
6: GO TO 850
 830 IF start<=24 THEN LET end=2
4: GO TO 850
 840 LET end=25
 849 REM check for peg in path
of ray
 850 LET diff=1: IF start>end TH
EN LET diff=-1
 860 FOR p=start TO end STEP dif
 869 REM check for absorption
 870 FOR n=1 TO nopeg
 880 IF v(n)=direct AND w(n)=p T
HEN GO TO 40
 890 IF w(n)=direct AND x(n)=p T
HEN GO TO 40
 900 IF x(n)=direct AND y(n)=p T
HEN GO TO 40
 910 IF y(n)=direct AND v(n)=p T
HEN GO TO 40
 920 NEXT n
 929 REM check for deflection
 930 FOR n=1 TO nopeg
 940 IF v(n)=direct+1 AND w(n)=p
 THEN GO TO 1120
 950 IF w(n)=direct+1 AND x(n)=p
 THEN GO TO 1080
 960 IF x(n)=direct+1 AND y(n)=p
 THEN GO TO 1080
 970 IF y(n)=direct+1 AND v(n)=p
 THEN GO TO 1120
 980 IF v(n)=direct-1 AND w(n)=p
 THEN GO TO 1080
 990 IF w(n)=direct-1 AND x(n)=p
 THEN GO TO 1120
1000 IF x(n)=direct-1 AND y(n)=p
 THEN GO TO 1120
1010 IF y(n)=direct-1 AND v(n)=p
 THEN GO TO 1080
1020 NEXT n
1030 NEXT p
1039 REM check type of ray path
for rays which have emerged
from the box
1040 LET exit=direct+16: IF dire
ct>16 THEN LET exit=direct-16
1050 IF exit=entry THEN GO TO 18
0
1060 IF deflec=0 THEN GO TO 260
1070 GO TO 100
1079 REM reset variables used in
plotting ray path if ray
deflected
1080 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1090 LET start=direct-16: IF p>8
 AND p<=24 THEN LET start=direct
+16
1100 LET direct=p+1: IF p>8 AND
p<=24 THEN LET direct=p-1
1110 GO TO 1180
1120 IF p=9 OR p=17 OR p=32 OR p
=8 THEN GO TO 180
1130 LET start=direct
1140 IF p<=8 THEN LET direct=p+1
7: GO TO 1180
1150 IF p<=16 THEN LET direct=p+
15: GO TO 1180
1160 IF p<=24 THEN LET direct=p-
17: GO TO 1180
1170 LET direct=p-15
1180 LET deflec=1
1190 GO TO 810
1198 REM set variables used in
ray path description
1199 REM absorption or
reflection
1200 LET posrow=1
1210 PAPER 7: INK 0
1220 GO SUB 1340
1230 GO TO 550
1239 REM deflection or straight
1240 LET posrow=0
```


BUG-BYTE SOFTWARE
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NEW SPECTRUM PROGRAM COMING SOON!
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```
1250 PAPER paper: INK ink
1260 GO SUB 1340
1270 LET guess=guess-1
1280 LET entry=exit
1290 PAPER paper: INK ink
1300 GO SUB 1390
1310 LET ink=ink+1
1320 IF ink=7 THEN LET ink=paper
/7+1: LET paper=ABS (paper-7)
1330 GO TO 550
1338 REM ray path description
1339 REM ray path display
1340 GO SUB 310
1350 PRINT AT 7+posrow,3-(LEN (S
TR$ (entry))-1);entry;" -"
1360 PRINT AT 9+posrow,0;p$
1370 IF posrow=1 THEN GO TO 1390
1380 PRINT AT 11,2;"to ";exit
1390 GO SUB 1480
1400 PRINT AT erow,ecol;"A"
1409 REM update number of
guesses and score
1410 PAPER 7: INK 2: INVERSE 0
1420 LET guess=guess+1
1430 PRINT AT 16,4-(LEN (STR$ (g
uess))-1);guess
1440 LET score=score-1
1450 IF score=9 THEN PRINT AT 20
,3;" "
1460 PRINT AT 20,4-(LEN (STR$ (s
core))-1);score
1470 RETURN
1479 REM find position of ray
entry (or exit) square on screen
1480 IF entry<=8 THEN LET erow=2
0: LET ecol=11+entry*2: RETURN
1490 IF entry<=16 THEN LET erow=
20-(entry-8)*2: LET ecol=11: RET
URN
1500 IF entry<=24 THEN LET erow=
2: LET ecol=11+(entry-16)*2: RET
URN
1510 LET erow=20-(entry-24)*2: L
ET ecol=29: RETURN
1518 REM

      cursor mode

1519 REM display cursor controls
1520 PAPER 7: INK 2
1530 PRINT AT 5,0;"0 -normal"
1540 PRINT AT 6,0;"3 -  plot"
1550 PRINT AT 7,0;"4 - erase"
1560 PRINT AT 8,0;"5 -  left"
1570 PRINT AT 9,0;"6 -  down"
1580 PRINT AT 10,0;"7 -    up"
1590 PRINT AT 11,0;"8 - right"
1600 PRINT AT 12,0;"9 - final"
1610 PRINT AT 13,0;"    guess"
1620 PAPER 0
1630 INK 6: IF ATTR (currow,curc
ol)=66 THEN INK 2
1640 PRINT FLASH 1;AT currow,cur
col;"A"
1649 REM check cursor input
1650 LET i$=INKEY$
1660 IF i$="0" OR i$="9" THEN GO
 TO 1920
1670 IF i$<"3" OR i$>"8" THEN GO
 TO 1650
1680 IF i$="3" THEN GO TO 1820
1690 IF i$="4" THEN GO TO 1870
1699 REM move cursor
1700 IF i$="5" THEN LET newrow=c
urrow: LET newcol=curcol-2: GO T
O 1740
1710 IF i$="6" THEN LET newrow=c
urrow+2: LET newcol=curcol: GO T
O 1740
1720 IF i$="7" THEN LET newrow=c
urrow-2: LET newcol=curcol: GO T
O 1740
1730 LET newrow=currow: LET newc
ol=curcol+2
1740 IF newrow<4 OR newrow>18 OR
 newcol<13 OR newcol>27 THEN GO
TO 1650
1750 BEEP .05,12
1760 INK 7: IF ATTR (currow,curc
ol)=194 THEN INK 2
1770 PRINT FLASH 0;AT currow,cur
col;"A"
1780 INK 6: IF ATTR (newrow,newc
ol)=66 THEN INK 2
1790 PRINT FLASH 1;AT newrow,new
col;"A"
1800 LET currow=newrow: LET curc
ol=newcol
1810 GO TO 1650
1819 REM plot peg
1820 IF ATTR (currow,curcol)=194
 THEN GO TO 1650
1830 BEEP .05,0
1840 PRINT INK 2; FLASH 1;AT cur
row,curcol;"A"
1850 LET peg=peg+1
1860 GO TO 1650
1869 REM erase peg
1870 IF ATTR (currow,curcol)=198
 THEN GO TO 1650
1880 BEEP .05,0
1890 PRINT INK 6; FLASH 1;AT cur
row,curcol;"A"
1900 LET peg=peg-1
1910 GO TO 1650
1919 REM leave cursor mode
1920 INK 7: IF ATTR (currow,curc
ol)=194 THEN INK 2
1930 PRINT FLASH 0;AT currow,cur
col;"A"
1940 FOR r=5 TO 13
1950 PRINT AT r,0;"          "
1960 NEXT r
1970 IF i$="0" THEN GO TO 550
1980 IF peg=nopeg THEN GO TO 209
0
1989 REM display warning if
wrong number of pegs plotted
1990 PAPER 7: INK 2
2000 GO SUB 310
2010 PRINT AT 7,1;nopeg;" pegs"
2020 PRINT AT 9,1;"must be"
2030 PRINT AT 11,1;"plotted"
2040 FOR b=1 TO 5
2050 BEEP .05,36
2060 NEXT b
2070 PAUSE 0: PAUSE 100
2080 GO TO 1520
2088 REM

      final guess

2089 REM check each guess
2090 FOR n=1 TO nopeg
2100 IF ATTR (ABS (w(n)-8)*2-20,
v(n)*2+11)=71 THEN GO SUB 2200:
GO TO 2120
2110 GO SUB 2140
2120 NEXT n
2130 GO TO 2290
2139 REM peg correctly located
2140 PRINT PAPER 2; INK 6; FLASH
 1;AT ABS (w(n)-8)*2-20,v(n)*2+1
1;"A"
2150 LET right=right+1
2160 FOR b=1 TO 5
2170 BEEP .05,24
2180 NEXT b
2190 RETURN
2199 REM peg incorrectly located
2200 PRINT PAPER 0; INK 6; FLASH
 1;AT ABS (w(n)-8)*2-20,v(n)*2+1
1;"A"
2210 PAPER 7: INK 2: FLASH 0
2220 FOR b=1 TO 5
2230 LET score=score-1
2240 LET poscol=3: IF score>=0 A
ND score<=9 THEN LET poscol=4: P
RINT AT 20,3;" "
2250 PRINT AT 20,poscol;score
2260 BEEP .05,12
2270 NEXT b
2280 RETURN
2289 REM display number of pegs
correctly located
2290 PAPER 7: INK 2
2300 GO SUB 310
2310 PRINT AT 7,2;right;" peg":
IF right=0 OR right>1 THEN PRINT
 AT 7,7;"s"
2320 PRINT AT 9,0;"correctly"
2330 PRINT AT 11,1;"located"
2340 PAUSE 0: PAUSE 200
2349 REM display player's
success rating
2350 GO SUB 310
2360 PRINT AT 7,2;"Your"
2370 PRINT AT 9,0;"score is"
2380 IF score>=25 THEN PRINT AT
11,0;"very good": GO TO 2440
2390 IF score>=20 THEN PRINT AT
11,2;"good": GO TO 2440
2400 IF score>=15 THEN PRINT AT
11,1;"not bad": GO TO 2440
2410 IF score>=10 THEN PRINT AT
11,2;"poor": GO TO 2440
```



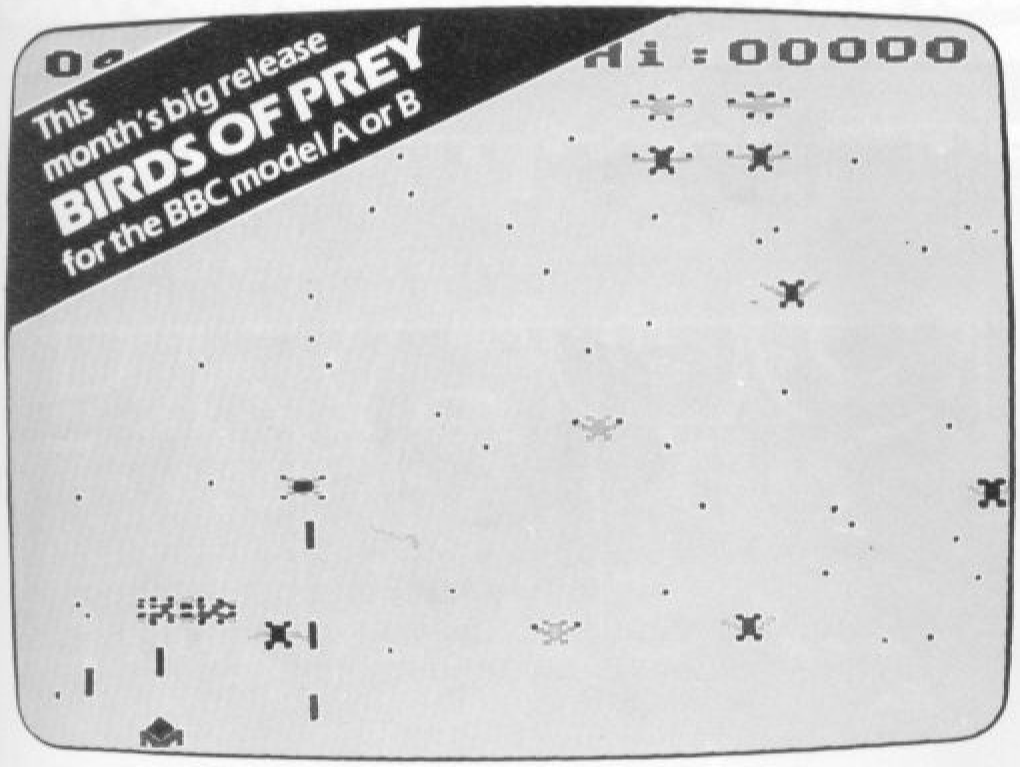
```
2420 IF score>=0 THEN PRINT AT 1
1,0;"very poor": GO TO 2440
2430 PRINT AT 11,1;"abysmal"
2439 REM input and check whether
to play again
2440 INPUT TAB (4);"Play game ag
ain(y/n)?";i$
2450 IF i$="y" THEN PAPER 0: GO
SUB 310: GO SUB 2490: GO TO 350
2460 IF i$<>"n" THEN GO TO 2440
2470 BORDER 7: PAPER 7: INK 0: B
RIGHT 0: CLS
2480 STOP
2488 REM

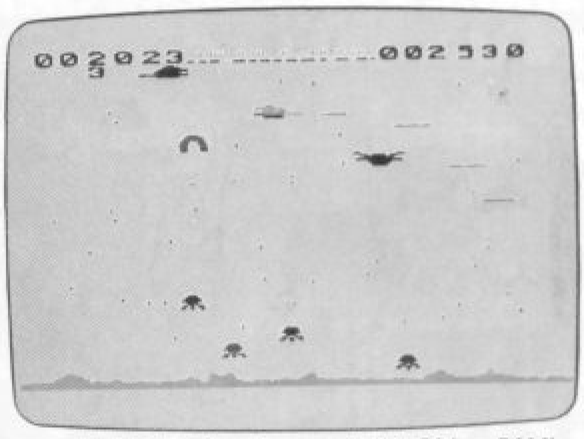
     Draw box

2489 REM refresh box after game
2490 PAPER 7
2500 PRINT AT 16,3;"    "
2510 PRINT AT 20,3;"    "
2520 LET score=33: LET guess=-1
2530 GO SUB 1410
2540 PAPER 0: INK 7
2550 PRINT AT 2,13;"
"
2560 FOR r=4 TO 18 STEP 2
2570 PRINT AT r,11;" "
2580 FOR c=13 TO 27 STEP 2
2590 PRINT AT r,c;"A"
2600 NEXT c
2610 PRINT AT r,29;" "
2620 NEXT r
2630 PRINT AT 20,13;"
"
2640 RETURN
2649 REM draw box outlines at
start of run
2650 PAPER 0: INK 7: CLS
2660 PRINT AT 0,0;" M I N I"
2670 PRINT AT 2,0;"B L A C K"
2680 PRINT AT 4,0;"  B O X"
2690 PRINT AT 14,0;" Guesses  "
2700 PRINT AT 18,0;"  Score   "
2710 PRINT AT 0,13;"1 1 1 2 2 2
2 2"
2720 PRINT AT 1,13;"7 8 9 0 1 2
3 4"
2730 FOR r=8 TO 1 STEP -1
2740 PRINT AT ABS (r*2-19),12;"E
CBCBCBCBCBCBCBCB"
2750 PRINT AT ABS (r*2-20),9;r+6
;TAB 11;" D D D D D D D D ";r+
24
2760 NEXT r
2770 PRINT AT 19,12;"BCBCBCBCBCE
CBCBCB"
2780 PRINT AT 21,13;"1 2 3 4 5 6
 7 8"
2790 RETURN
2798 REM

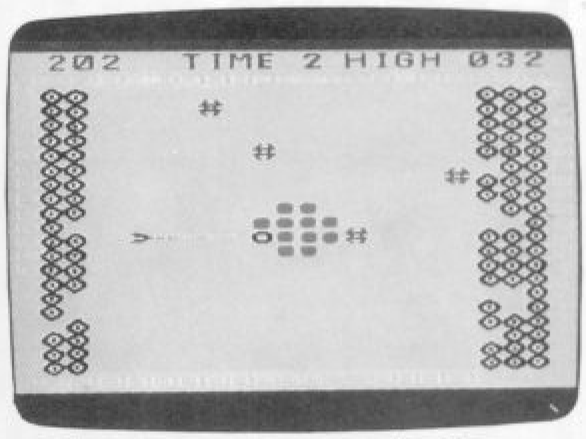
     Title pages

2799 REM introduction
2800 BORDER 0: PAPER 0: INK 6: F
LASH 0: BRIGHT 1: OVER 0: INVERS
E 0: CLS
2810 FOR r=0 TO 21
2820 IF r=12 THEN INK 2
2830 IF r=13 THEN INK 6
2840 BEEP .01,24: BEEP .01,r
2850 PRINT AT r,0;"BLACK  BOX"
2860 PRINT AT ABS (r-21),14;"MIN
I"
2870 PRINT AT r,22;"BLACK  BOX"
2880 NEXT r
2890 INK 0
2900 FOR r=21 TO 0 STEP -1
2910 IF r=12 THEN INK 2
2920 IF r=11 THEN INK 0
2930 PRINT AT r,0;"BLACK  BOX"
2940 PRINT AT ABS (r-21),14;"MIN
I"
2950 PRINT AT r,22;"BLACK  BOX"
2960 BEEP .01,24: BEEP .01,r
2970 NEXT r
2980 INK 2
2990 PRINT AT 12,14;"    "
3000 FOR c=0 TO 10
3010 PRINT AT 12,c;"           "
3020 PRINT AT 12,ABS (c-22);"
  "
3030 PRINT AT 12,c+1;"BLACK  BOX
"
3040 PRINT AT 12,ABS (c-21);"BLA
CK  BOX"
3050 BEEP .01,24
3060 NEXT c
3070 FOR b=24 TO 0 STEP -1
3080 BEEP .01,b
3090 NEXT b
3100 FOR b=1 TO 24
3110 BEEP .01,b
3120 NEXT b
3130 INK 7
3140 PRINT AT 6,10;"Waddington's
"
3150 PRINT AT 9,14;"MINI"
3160 PRINT AT 12,11;"BLACK  BOX"
3169 REM read data for user-
defined graphics characters
3170 FOR g=1 TO 4
3180 READ g$
3190 FOR l=0 TO 7
3200 READ line
3210 POKE USR g$+l,line
3220 NEXT l
3230 NEXT g
3240 PRINT AT 21,3;"Press any ke
y to play game"
3250 IF INKEY$="" THEN GO TO 325
0
3259 REM display controls
3260 CLS
3270 PRINT PAPER 7; INK 2;"Contr
ols"
3280 PRINT AT 3,0;"Normal mode"
3290 PRINT "(for guesses)"
3300 PRINT : PRINT "0          -
 go into cursor mode"
3310 PRINT "1-32       -
your guesses"
3320 PRINT AT 10,0;"Cursor mode"
3330 PRINT "(for plotting pegs)"
3340 PRINT : PRINT "0      -    r
eturn to normal mode"
3350 PRINT "3          -
  plot a peg"
3360 PRINT "4          -
 erase a peg"
3370 PRINT "5       -     cursor lef
t one square"
3380 PRINT "6       -     cursor dow
n one square"
3390 PRINT "7       -       cursor u
p one square"
3400 PRINT "8       -    cursor righ
t one square"
3410 PRINT "9       -       for your
 final guess"
3420 GO TO 350
3429 REM data for user-defined
graphics characters
3430 DATA "A",BIN 00000000,BIN 0
0111100,BIN 01111110,BIN 0111111
0,BIN 01111110,BIN 01111110,BIN
00111100,BIN 00000000
3440 DATA "B",BIN 00011000,BIN 0
0011000,BIN 00011000,BIN 1111111
1,BIN 11111111,BIN 00011000,BIN
00011000,BIN 00011000
3450 DATA "C",BIN 00000000,BIN 0
0000000,BIN 00000000,BIN 1111111
1,BIN 11111111,BIN 00000000,BIN
00000000,BIN 0000000
3460 DATA "D",BIN 00011000,BIN 0
0011000,BIN 00011000,BIN 0001100
0,BIN 00011000,BIN 00011000,BIN
00011000,BIN 00011000
```





TIME DESTROYERS for the expanded Vic 20 (any RAM)



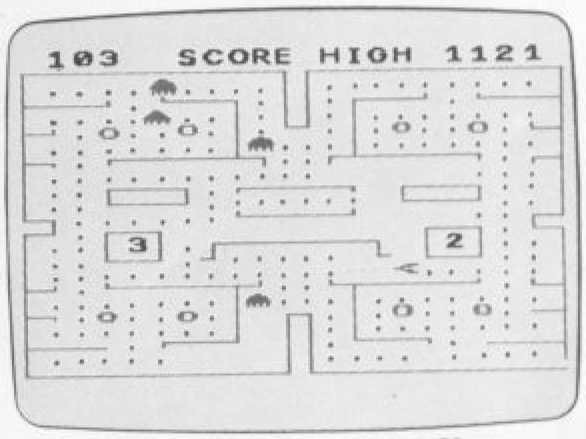
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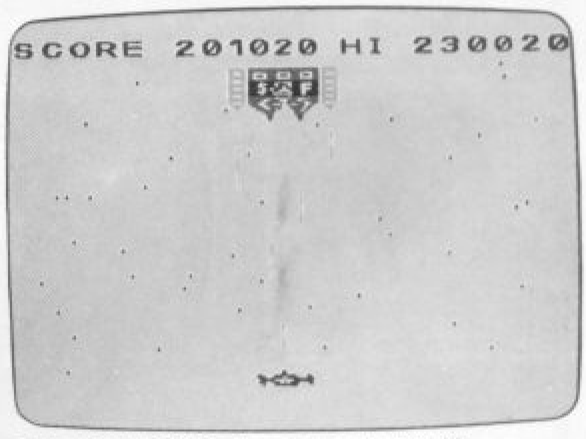
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Your best space fighter pilots have been briefed about this mission. They know they may not return. They must attack the Death Star's most vulnerable spot — which can only be reached by flying down a narrow "trench" on the star's vast superstructure.

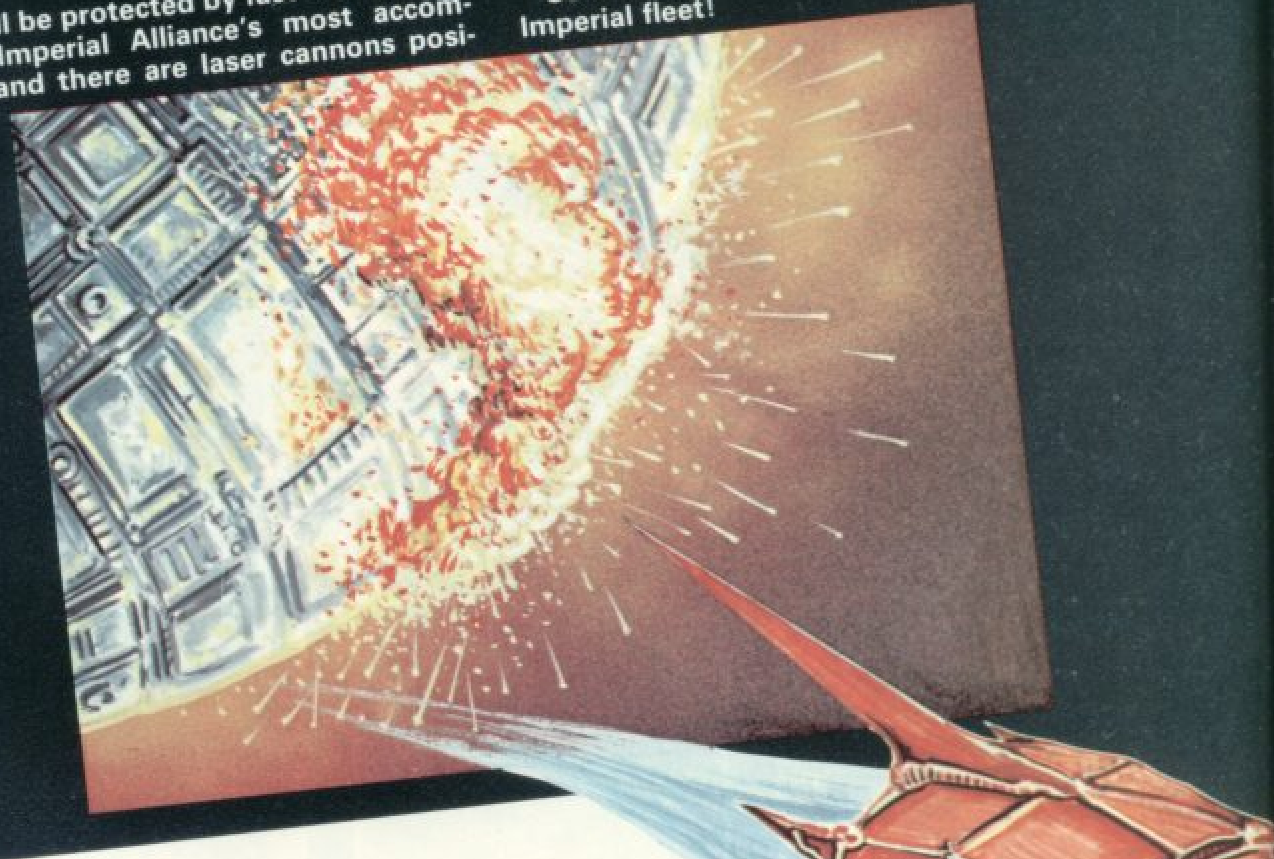
The trench will be protected by fast Tie fighters, flown by the Imperial Alliance's most accomplished pilots, and there are laser cannons positioned in and around the trench itself.

You join the action just as the rebel fighters are zapping down in to the trench to do battle with the Imperial forces. Your ship is protected by an energy shield which is depleted each time an enemy cannon scores a hit on your craft.

You have to travel along the trench shooting down enemy fighters and when the radio-active waste exhaust chute opening appears you must score a direct hit on it to restore your shields and destroy the deadly Death Star.

You must shoot down all your attackers too — if you simply dodge one he'll be back to blast you out of the skies when you least expect it.

So stand by for action — and watch out for the Imperial fleet!

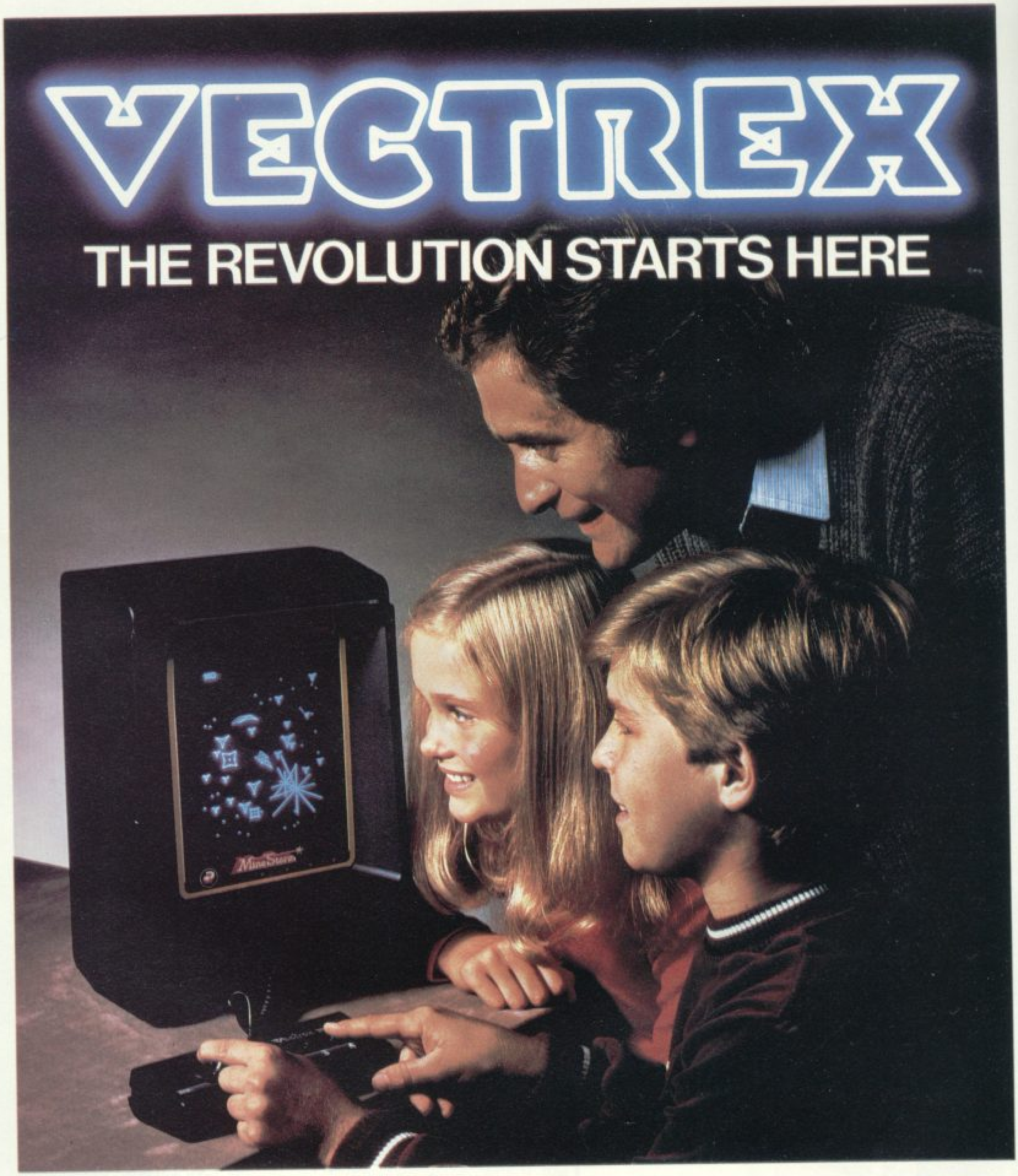


```
10 A=10
11 W=0
12 R1=5
13 F1=0:F2=0:F3=0:F4=0
19 GOTO 30
20 HS=0
30 SC=0
40 CLS3
50 GOTO 220
60 PLAY"T255O5CO4GO5C":IF PPOINT(X+10,Y)=4 THEN GOTO 70 ELSE GOTO180
70 IF S=1 THEN GOTO 180
80 IF R2=R1+5 THEN GOTO 180
90 IF Z>105 THEN R2=R1:R1=R1+5:S=1:RES=R1:GOTO 170
100 IF F=1 THEN SC=SC+100
110 IF F=2 THEN SC=SC+75
120 IF F=3 THEN SC=SC+50
130 IF F=4 THEN SC=SC+25
140 F=1:PUT(C1,B1)-(C1+26,B1+14),F3:B=120:A=A-1
150 PLAY"O1T25AGAGAAGAGAGA"
160 GOTO 180
170 PLAY"O3T255CC£DD£EFF£GG£AA£BO4C"
180 REM
190 LINE(70,192)-(X+10,Y),PSET:LINE(186,192)-(X+10,Y),PSET
200 RETURN
```

```
210 END
220 A$="C3;S9;R3E2U3D3F2R3L3G2D3U3H3"
230 PCLEAR8:PMODE1,1:PCLS
240 COLOR3,1
250 LINE(0,100)-(122,100),PSET:LINE-(122,108),PSET:LINE-(134,108),PSET:LINE-(134
,100),PSET:LINE-(256,100),PSET
260 PAINT(0,0),3,3
270 LINE(0,116)-(122,100),PSET:LINE(20,192)-(122,108),PSET:LINE(256,116)-(134,10
0),PSET:LINE(236,192)-(134,108),PSET
280 LINE(0,102)-(106,102),PSET:LINE-(106,120),PSET:LINE-(152,120),PSET:LINE-(152
,102),PSET:LINE-(256,102),PSET
290 LINE(0,106)-(78,106),PSET:LINE-(78,144),PSET:LINE-(178,144),PSET:LINE-(178,1
06),PSET:LINE-(256,106),PSET
300 LINE(0,114)-(16,114),PSET:LINE-(16,192),PSET
310 LINE(256,114)-(240,114),PSET:LINE-(240,192),PSET
320 CLS3:PRINT@12,"........";:PRINT@44,":TRENCH:";:PRINT@76,"........";
330 FOR I=2 TO 1 STEP-1
340 PAINT(30,130),1,3:PAINT(150,180),1,3:PAINT(220,140),1,3
350 PAINT(10,112),1,3:PAINT(250,112),1,3:PAINT(110,110),1,3:PAINT(130,118),1,3:P
AINT(150,110),1,3
360 IF I=2 THEN PCOPY2 TO 3
370 COLOR3,1
380 NEXT
390 PRINT@128,"YOU HAVE TO TRAVEL ALONG THE    TRENCH SHOOTING DOWN ENEMY      F
IGHTERS";
400 PAINT(10,130),2,3:PAINT(250,150),2,3:PAINT(0,104),2,3:PAINT(90,110),2,3:PAIN
T(130,130),2,3:PAINT(160,120),2,3:PAINT(256,104),2,3:PAINT(120,104),1,3:PAINT(13
0,110),1,3:PAINT(138,106),1,3
410 PCOPY2 TO 5
420 PRINT@256,"WHEN THE HOLE APPEARS YOU HAVE  TO FIRE INTO IT TO RECHARGE YOURE
NERGY SHIELDS";
430 PCLS
440 LINE(0,100)-(122,100),PSET:LINE-(122,108),PSET:LINE-(134,108),PSET:LINE-(134
,100),PSET:LINE-(256,100),PSET
450 PAINT(0,0),3,3
460 LINE(0,116)-(122,100),PSET:LINE(20,192)-(122,108),PSET:LINE(256,116)-(134,10
0),PSET:LINE(236,192)-(134,108),PSET
470 LINE(110,100)-(110,118),PSET:LINE-(148,118),PSET:LINE-(148,100),PSET
480 LINE(0,104)-(90,104),PSET:LINE-(90,134),PSET:LINE-(166,134),PSET:LINE-(166,1
04),PSET:LINE-(256,104),PSET
490 LINE(0,110)-(46,110),PSET:LINE-(46,170),PSET:LINE-(210,170),PSET:LINE-(210,1
10),PSET:LINE-(256,110),PSET
500 PRINT@384,"THE TOP LINE SHOWS DIST TO HOLE THE BOTTOM LINE IS SHIELD ENERGY"
;
510 FOR I=2 TO 1 STEP-1
520 PAINT(0,114),1,3:PAINT(30,150),1,3:PAINT(130,180),1,3:PAINT(230,160),1,3:PAI
NT(250,114),1,3
530 REM
540 PAINT(0,102),1,3:PAINT(100,110),1,3:PAINT(130,130),1,3:PAINT(160,110),1,3:PA
INT(256,102),1,3
550 IF I=2 THEN PCOPY 2 TO 4
560 NEXTI
570 PAINT(0,106),2,3:PAINT(70,120),2,3:PAINT(130,150),2,3:PAINT(190,130),2,3:PAI
NT(256,106),2,3
580 PAINT(116,106),2,3:PAINT(130,112),2,3:PAINT(140,106),2,3
590 PCOPY 2 TO 6
600 PRINT@485,"PRESS SPACE TO LAUNCH";:FOR P=1 TO 500:NEXTP
610 R1=5
620 RES=R1
630 SC=0
640 PRINT@485,"                     ";:FOR P=1 TO 500:NEXTP
650 Q$=INKEY$:IF Q$=" " THEN GOTO 670
660 GOTO 600
670 REM
680 CLS3
690 GOSUB1790
700 GOSUB1450
710 A$="C3;S9;R3E2U3D3F2R3L3G2D3U3H2"
720 PAINT(0,0),3,3
725 IF HS>0 THEN W=1
730 IF W>=1 THEN GOTO 800
740 CIRCLE(20,25),10,2
750 FOR I=1 TO 15
760 X=RND(255):Y=RND(90)
770 PSET(X,Y,2):NEXT
780 PAINT(20,25),1,2
790 SCREEN1,0
800 GOSUB1450
805 SCREEN1,0
810 COLOR4,2
820 LINE(0,5)-(256,5),PRESET
```

```
830 LINE(0,8)-(RES,8),PRESET
840 A=A1+5
850 W1=W
860 FOR I=3 TO 6
870 PCOPY I TO 2
880 LINE(256,5)-(DIST+1,5),PSET
890 LINE(RES+5,8)-(RES+1,8),PSET
900 IF DIST=0 THEN GOSUB1720
910 X=JOYSTK(0)*2+50:Y=JOYSTK(1)*2+110
920 IF I=3 OR I=5 THEN F=F+1:IF F>4 THEN F=0
930 IF A<=0 THEN GOTO 950
940 ON F GOSUB 1050,1150,1240,1330
950 IF Y>180 THEN Y=180
960 IF DIST=0 AND A>=1 THEN GOTO 1590
970 DRAW"BM"+STR$(X)+","+STR$(Y)+";"+A$
980 IF PEEK(65280)=254 OR PEEK(65280)=126 THEN GOSUB 60
990 DIST=DIST-1
1000 IF DIST<=1THEN DIST=0
1010 IF RES<=1 THEN GOTO 1550
1020 NEXT
1030 IF W=W1+1 THEN GOTO 830
1040 GOTO 860
1050 AA=RND(3)
1060 IF AA=1 THEN C=C+10
```

Illustration: Dorian Cross



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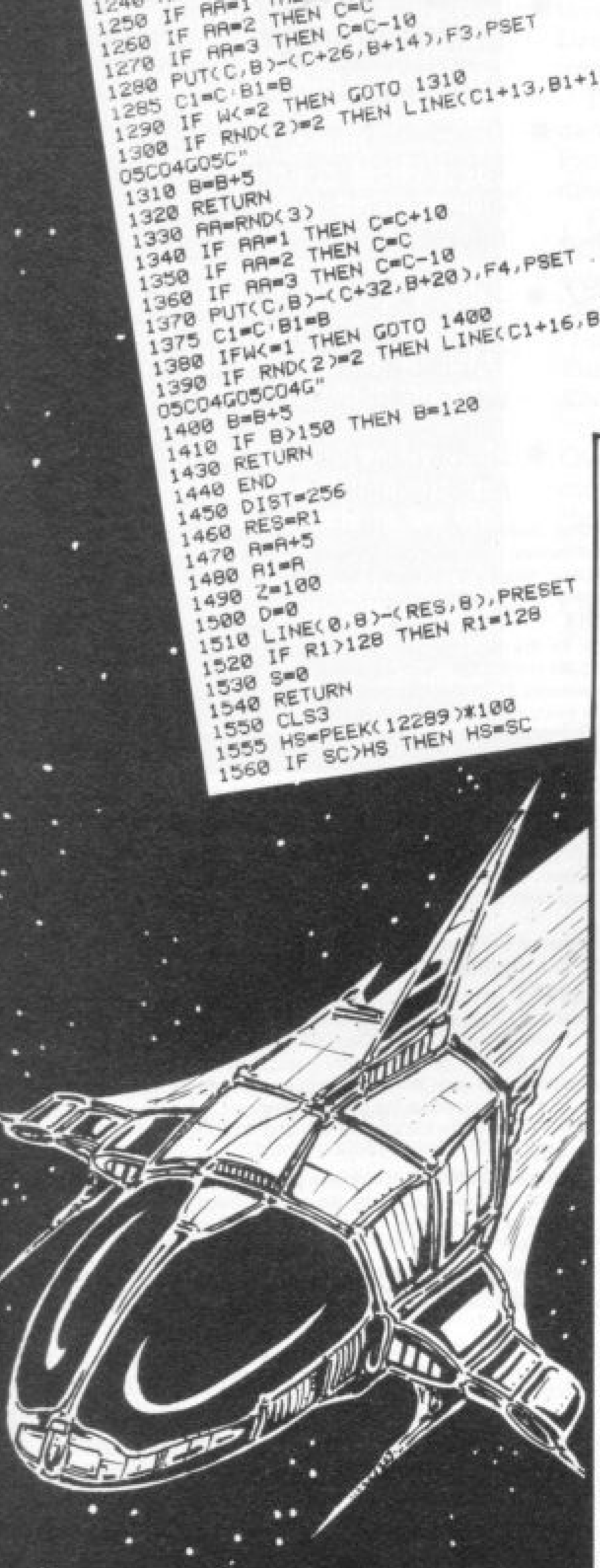
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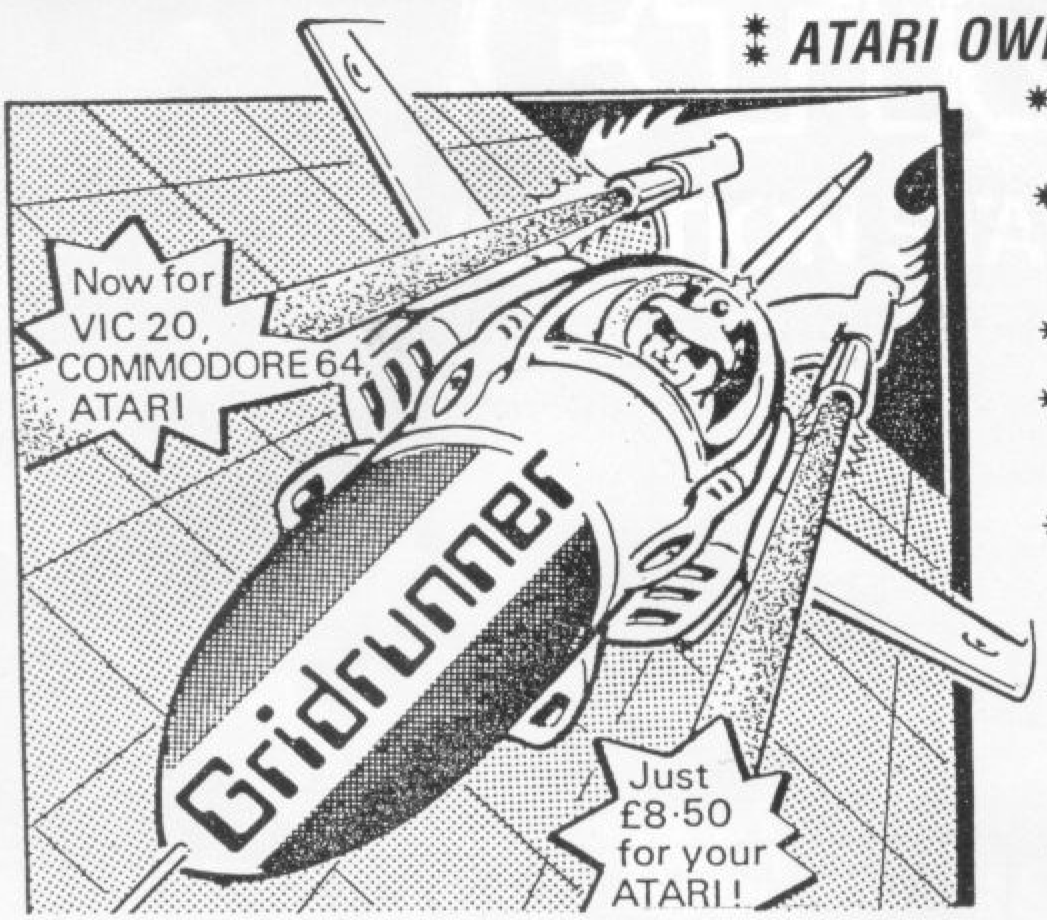
```
1070 IF AA=2 THEN C=C
1080 IF AA=3 THEN C=C-10
1090 B=120:C=128
1100 PUT(C,B)-(C+20,B+10),F1,PSET
1105 C1=C:B1=B
1110 B=B+5
1120 IF W<=4 THEN GOTO 180
1130 IF RND(2)=2 THEN LINE(C1+10,B1+10)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G
05C04G05C"
1140 RETURN
1150 AA=RND(3)
1160 IF AA=1 THEN C=C+10
1170 IF AA=2 THEN C=C
1180 IF AA=3 THEN C=C-10
1190 PUT(C,B)-(C+22,B+12),F2,PSET
1195 C1=C:B1=B
1200 IF W<=3 THEN GOTO 1220
1210 IF RND(2)=2 THEN LINE(C1+11,B1+12)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G
05C04G05C"
1220 B=B+5
1230 RETURN
1240 AA=RND(3)
1250 IF AA=1 THENC=C+10
1260 IF AA=2 THEN C=C
1270 IF AA=3 THEN C=C-10
1280 PUT(C,B)-(C+26,B+14),F3,PSET
1285 C1=C:B1=B
1290 IF W<=2 THEN GOTO 1310
1300 IF RND(2)=2 THEN LINE(C1+13,B1+14)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G
05C04G05C"
1310 B=B+5
1320 RETURN
1330 AA=RND(3)
1340 IF AA=1 THEN C=C+10
1350 IF AA=2 THEN C=C
1360 IF AA=3 THEN C=C-10
1370 PUT(C,B)-(C+32,B+20),F4,PSET
1375 C1=C:B1=B
1380 IFW<=1 THEN GOTO 1400
1390 IF RND(2)=2 THEN LINE(C1+16,B1+20)-(128,192),PSET:RES=RES-1:PLAY"T25505C04G
05C04G05C04G"
1400 B=B+5
1410 IF B>150 THEN B=120
1430 RETURN
1440 END
1450 DIST=256
1460 RES=R1
1470 A=A+5
1480 A1=A
1490 Z=100
1500 D=0
1510 LINE(0,8)-(RES,8),PRESET
1520 IF R1>128 THEN R1=128
1530 S=0
1540 RETURN
1550 CLS3
1555 HS=PEEK(12289)*100
1560 IF SC>HS THEN HS=SC
```



```
1570 PRINT@32,"YOUR SHIELD WAS DESTROYED BY     CANNON FIRE";
1580 GOTO 1610
1590 CLS3:PRINT@32,"YOU WERE SHOT DOWN BY A T.I.E    FIGHTER WHICH YOU HAD NOT
    DESTROYED ON THE WAY TO THE HOLE";
1595 HS=PEEK(12289)*100
1600 IF SC>HS THEN HS=SC
1610 PRINT@325,"SCORE";SC;
1615 SC=0:A=10
1616 R1=5
1620 PRINT@357,"HIGH SCORE=";HS;
1624 HS=HS/100
1625 POKE(12289),HS
1630 PRINT@448,"ANOTHER GO?(Y/N)";
1640 Q$=INKEY$:IF LEFT$(Q$,1)="Y" OR LEFT$(Q$,1)="A" THEN GOTO 1670
1650 IF LEFT$(Q$,1)="N"THEN END
1660 GOTO 1640
1670 PRINT"INSTRCTIONS(Y/N)";
1680 Q$=INKEY$:IF LEFT$(Q$,1)="N" THEN W=0:GOTO 2000
1690 IF LEFT$(Q$,1)="Y" THEN RUN
1700 GOTO 1680
1710 END
1720 IF X>=180 AND A>0 THENGOTO 1550
1730 PAINT(130,Z),4,3
1740 Z=Z+10
1750 COLOR4,2
1760 IF Z>=185 THEN Z=100:DIST=256:LINE(0,5)-(DIST,5),PRESET:W1=W:W=W+1:S=0
1770 RETURN
1780 END
1790 PMODE1,1:PCLS
1800 A$="BM100,100;C4;BR2H2U4E2G2D2R6U2E2F2L3D4F2E2L3R3U2R6U2H2F2D4G2"
1810 DIMF1(20,10)
1820 DRAWA$
1830 GET(100,90)-(120,100),F1,G
1840 PCLS
1850 DIMF2(22,12)
1860 B$="BM130,100;C4;BR4H3U3E3G3D2R4E5D2G3R2D2R4U2L4R4H3U2F4D2R6G3E3U3H3
1870 DRAWB$
1880 GET(130,88)-(152,100),F2,G
1890 PCLS
1900 C$="BM100,150;C4;BR4H3U5E3G3D3R3E4R3U2D2R3L4G4R2U2D3L2F3R7L2E3L7R7U3H4F4R2H
4F4D3U1R5U3H3F3D5G3
1910 DIMF3(26,14)
1920 DRAWC$
1930 GET(100,136)-(126,150),F3,G
1940 PCLS
1950 D$="BM150,150;C4;BR6H6U6E6G6D3R6E6R6D2L5G4R2D2F4R4E4G2L8U2R9U3R2H5R2F6R5U3H
6F6D6G6"
1960 DRAW D$
1970 DIMF4(32,20)
1980 GET(150,130)-(182,150),F4,G
1990 RETURN
2000 CLS3:PRINT@485,"PRESS SPACE TO LAUNCH";:FOR P=1 TO 500:NEXT
2010 Q$=INKEY$:IF Q$=" " THEN GOTO 2050
2020 PRINT@485,"                      ";
2030 FOR P=1 TO 500:NEXT
2040 GOTO 2000
2050 CLS3:FOR L=1 TO 800:NEXTL:GOTO 700
```

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Your spacecraft must attack the descending aliens and frustrate their evil intent. Fly your Ramjet fighter over the Andes mountain range and protect your llamas from kidnap by hostile UFOS. Features 5 kinds of UFO, controls include up, down, reverse, fire, thrust and smart bomb. Entirely in machine code. Requires 8K expansion and joystick. £8.00 + 50p P & P.

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This is VIC 20 cross breed between the now famed 'Packman' and the game 'Quix'. All in machine code, fast and fun with joystick controls, uses Hi-Res colour graphics. 8K or larger expansion needed. Only £6.00 + 50p P & P complete with instructions.

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ATTACK OF THE MUTANT CAMELS J
Planet Earth needs you! Hostile aliens have used genetic engineering to mutate camels from normally harmless beasts into 90 foot high, neutronium shielded, laser-spitting death camels!! Can you fly your tiny, manoeuvrable fighter over the mountainous landscape to weaken and destroy the camels before they invade the human stronghold! You must withstand withering laser fire and alien UFOs. Game action stretches over 10 screen lengths and features superb scrolling, scanner, 1/2 player actions and unbelievable animation! Play this game and you'll never be able to visit a zoo again without getting an itchy trigger finger! Awesome m/c action! £8.50 + 50p P & P.

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BOMBER (16K)
Yes, a full feature version of the popular game 'Blitz', supplied for the 16K or 48K Spectrum. For only £2.95 + 50p P & P.

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Colourful new game starring Chico the headbanger who you must guide to riches through an increasing shower of heavy metal. Gain bonuses for headbanging but be sure to take an aspirin when the pain gets too much! Basic + m/c to speed up action. Great graphics, nice animation. Will even drive William Stuart system's voice synthesiser to produce speech output. Can you attain the grade of 'Rocker Class One' or will you be "Barry Manilow Class 5"? Start headbanging to-day and find out. £4.95 NEW.

SUPERDEFLEX (48K)
Bounce 'Sid', the space invader, around the screen into the power pods, keeping away of course from the devil who chases you around the screen. Steer with your Deflex shields, but beware the mines or you may be buried alive! Superb graphics and fantastic sound on the 48K Spectrum only. Only £4.95 on cassette + 50p P & P.

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ZX81



CENTIPEDE (16K)
The ORIGINAL game from the ORIGINAL author. This is the identical program to that being sold by other companies for three times our price. The game has received ecstatic reviews in the computing press. Program has 30 speed levels and ever increasing Centipede hordes. Tables top 10 scores and names. Why wait to pay more? Only £1.95 + 50p P & P.

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MIND OVER MATTER . . .

Now that my series of programming tips has been concluded, I shall be devoting a corner to hints on solving some of the more difficult problems that are stumping Adventure-playing readers.

These will be printed upside down, so as not to catch the eyes of those wishing to battle on!

Readers often write to me requesting help but unfortunately, although I have played many Adventures, I have not solved them all! So help me to help fellow Adventurers by writing to me with tips.

At the moment David Coverley and Anthony Sanford are languishing in Artic's 'Ship of Doom', unable to set the key from under the glass.

Steven Milligan, meanwhile, hasn't cracked the secret of Artic's 'Espionage Island'. Can you help me help them, and save them from otherwise certain insanity?

What's in a package? How much are you tempted by a large attractive box in a plastic bubble, covered with a design suggesting fantasy and excitement within?

Do you ever suspect that you may have had to pay a few pounds less had that same cassette been more plainly wrapped? The ultimate test, of course, is in the invisible magnetic impressions on that cassette.

Here we have two games. One is lavishly packaged in a beautifully illustrated box, and quite expensive; the other supplied on a proprietary cassette with a duplicated instruction sheet, and at the low end of the price spectrum. No pun intended!

Transylvanian Tower is billed as a 'spine-chilling new Adventure' for the 48k Spectrum. Unfortunately it is not.

There are five levels in the tower, and the player's objective is to reach the top, kill Count Dracula, and raid his treasure trove. Each level consists of a maze, and each has different characteristics.

A floor plan of the level can be called up, with increasing difficulty as one nears the top.

Objects, many of which have magical properties, may be picked up if seen by typing "P", but only three may be carried simultaneously.

The same is screened graphically in colour and bats, which are a hazard, can be seen flapping around. Sufficient must be killed to enable you to move up a level. How do you kill the bats to get to Dracula? Would you believe with a laser gun?

This might be a reasonable maze game, but good Adventure it is not. From Richard Shepherd Software, this is disappointing after *Shaken not Stirred.*

For £6.50 you will get the game on a TDK cassette, and a fairly comprehensive two-page description of how to load and play the game.

"I am Overmind;
Ruler of mortals, destroyer of worlds!
Know me, obey me, and despair!"

With terror in your heart, you wish Overmind dead. But Overmind is omniscient, knowing even your innermost thoughts, and inflicts upon you the pain of a thousand lashes.

Before you start playing *Empire of the Overmind* it is almost essential to read the Rhyme of the Overmind, supplied with the game.

On starting, you find yourself among mountains and brooks, where tracks and trails abound, and ever present in the sky is a large red planet.

A mysterious stone tower appears to hold no secrets other than an animated skeleton who clobbers you as soon as you take the key which hopefully will unlock an iron door. Unconscious, your body is moved. You will more than likely end up in a very dark place. I did many times, and despaired.

But the game imparts such a feeling of intense hatred toward Overmind, that I was determined not to be beaten.

Thus, I came to a place where there was a large blue planet in the sky. I haven't yet defeated Overmind but I shall return to fight again!

At first the game appears insoluble due to the difficulty of getting out of the "very dark place". However, and this may help the disheartened player, when "clobbered" unconscious, you don't always end up in "a very dark place". I'll say no more than that!

Another problem is that it appears a held object cannot be used (although it may be dropped) unless it heads the inventory list.

Whether or not this feature is deliberate is hard to say, but it involves the rather tedious task of dropping every object that precedes the required one in the inventory list, using it, and then picking up the discarded ones.

This task isn't aided by the rather slow response time. Whilst the reply is screened quickly enough, the prompt sometimes takes a long time to appear, and a fast player can easily lose all or part of his next command without realising it.

A large colourful box, complete with internal plastic moulding, housed *Empire of the Overmind.* Also included was a double page of detailed, well printed instructions on how to load and save the game on a 48k Apple, 48k TRS-80, and 40k Atari 800.

This was quite important, as the methods although simple were not obvious. Also in the package was 'Rhyme of the Overmind', a long and rather well-written poem printed in script on pale blue parchment-like paper.

This covered a number of pages held together with a silken cord emellished with — yes! — a tassel!

Oh, I nearly forgot! The box also contained a cassette containing all three versions of the game.

It is available from Avalon Hill Games of 650 High Road, North Finchley, London N12 ONIL for £17.95 on cassette, £20.95 on disc.

ADVENTURE TIPS

Howdy! The stage arrived last week bringing cries of help from a number of would-be cowboys in Ghost Town.

There they are, standing next to a pesky horse, and quite unable to get the darned critter movin'. Now then folks, don't go getting no fancy ideas that I'm gonna give away all my ol' pal Scott's secrets. Leastwise, not unless you take me down to that there saloon and fetch me something a mite stronger than what's in your Golden Derringer.

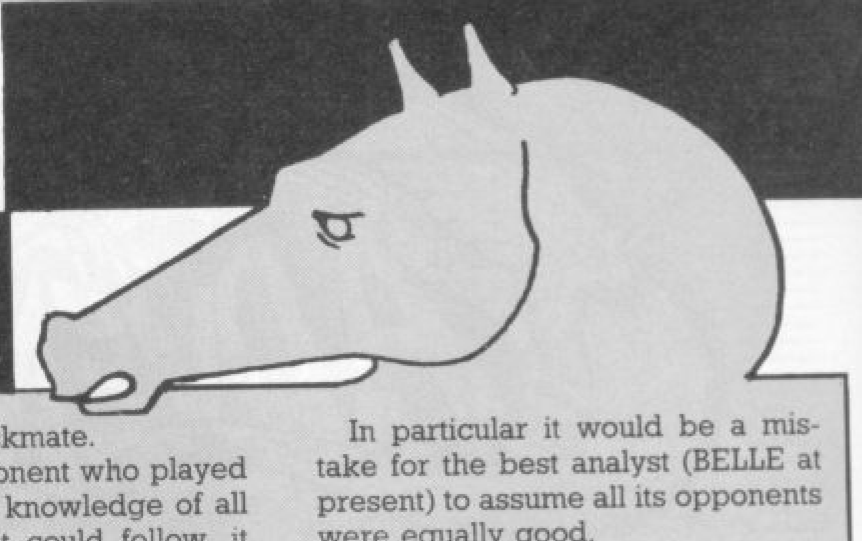
Nope — just a few hints to chew over until you get right inspired, that's all you'll get out of me!

WARNING:
Turning this page upside-down may damage your Adventure!

The key to shoeing the horse is in the jail. The key to the jail is in the stable. The solution is magnetic. When the horse is shod, mount him and say the right words. If this problem sends you round and round you may get giddy.

BY KEITH CAMPBELL

CHESS



THE DUCHESS AND KAISSA

I left you with a celebrated position (figure 1) from the first round game between Duchess and Kaissa, at that time the reigning world champion program, at the second world computer chess championship in Toronto in 1977.

In the diagrammed position, Duchess (White) had just played 34. Q-R8ch, a check which can be parried by a King move to N2.

However, Kaissa's next move astounded the entire audience, which included former world (human) champion Mikhail Botvinnik and other strong masters, plus the team of expert commentators.

It played 34. . . . R-K1, placing the Rook *en prise*. After Duchess' 35. QxRch, Kaissa lost quickly. The task for Kaissa's programmers before the next round was to find out what caused the program to commit such a gross blunder and correct the fault.

Only later was it realised that Kaissa's 34th move was not a blunder at all. If instead Black had played 34. . . . K-N2, White could give checkmate by the Queen sacrifice 35. Q-B8ch! followed, after 35. . . . KxQ by 36. B-R6ch.

Whether Black now were to play 36. . . . B-N2 or 36. . . . K-N1, 37. R-B8ch would be checkmate (apart from irrelevant sacrifices by Black to delay the end by a move or two).

Kaissa's evaluation function clearly ranked losing a Rook as preferable to being checkmated, which solves the mystery. However, the question remains: is 34. . . . R-K1 a blunder or a brilliancy?

ROOK DILEMMA

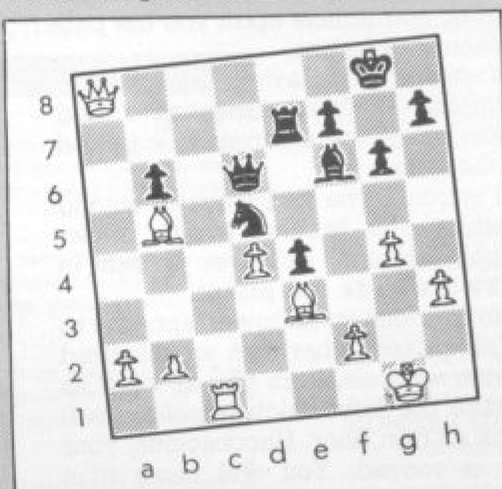
It is surprisingly difficult to answer this with confidence. Objectively, losing a Rook must be preferable, but it could be argued that losing the Rook is only slightly less fatal, does not postpone checkmate very long, and moreover even the humblest beginner would capture the Rook, whereas even quite a good player might just conceivably overlook the checkmate.

Against an opponent who played 34. Q-R8ch in full knowledge of all the variations that could follow, it makes little difference what Black plays, the best course of action probably being to resign, but what if White had played the check in ignorance, simply as an "irritant" to Black?

What if White were a weak player and Black a Grandmaster (an unlikely event admittedly, but quite possible in a simultaneous tournament or in a material odds game?).

STAYING ALIVE

Would it be better to move the King and rely on White not following up properly (as well as the checkmate there is the strong reply 35. R-B8, of course) or to give up the Rook to guarantee staying "alive"



and then hope somehow to win even though a Rook behind in material?

The problem becomes more difficult if the details are changed a little: what if Black were already a Bishop ahead or if the checkmate were 10 moves (each side) deep, or both?

Considerations of this kind are far from irrelevant in computer play, where programs can often vary considerably in analytic powers, and where a program will frequently be "blind" to a strong move which human experts perceive easily.

It would be completely wrong to assume that all computer chess programs are deep or infallible analysts (although some are extremely good).

In particular it would be a mistake for the best analyst (BELLE at present) to assume all its opponents were equally good.

There is a well-known joke about an ultra-intelligent chess-playing program considering its first move in a game, as White.

After hours of analysis it decides that the opening position is, after all, a forced win for Black in every variation.

Rather than waste any more time defending a hopeless position, it immediately resigns without playing a move!

The flaw in the argument is, of course, that chess is a contest where the opponent's fallibility plays a crucial part.

So, how would Kaissa have made its decision? From a competitive viewpoint, it should have taken the strength of its opponent into account.

No doubt Duchess was strong enough to win when a Rook ahead, but would its analysis algorithm have caused it to consider the Queen sacrifice?

If it did, would it have been able to look far enough ahead to discover the checkmate?

In more subtle ways, judgements about the skill level of the opponent are an important part of human play. Grandmasters prepare specially for their major opponents by studying their games and playing style, and looking for weaknesses.

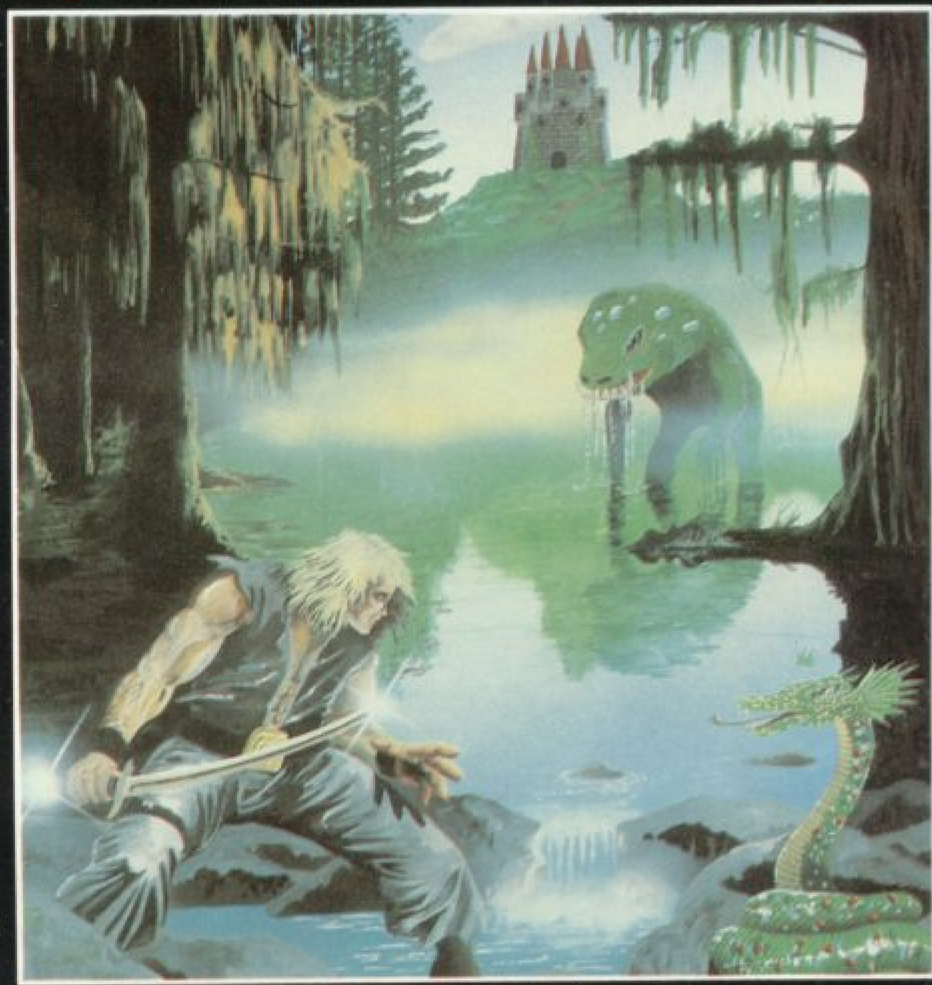
It is interesting to speculate whether chess-playing programs of the future will include representations of their main rivals' algorithms in a similar way.



BY MAX BRAMER

KAYDE

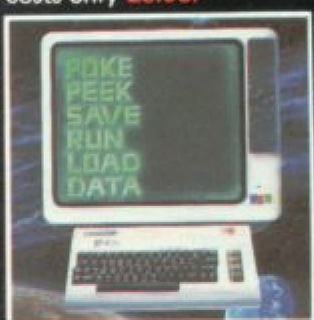
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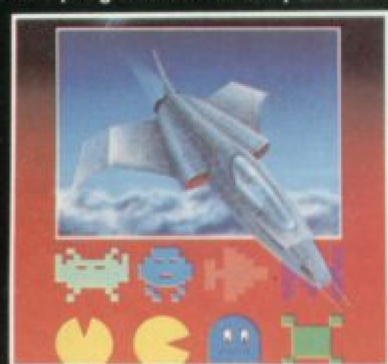
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FIND THE ENEMY

```
0000             00100          ORG     0
                 00101 ;X$(16) - RANGE
                 00102 ;===============
                 00103 ;FINDS ENEMY
                 00104 ;===============
                 00105 ;
6B8A             00116 NA       EQU     27530D
6AD0             00117 TB       EQU     27344D
7F6E             00120 INIT     EQU     07F6EH
7F72             00121 SAVE     EQU     07F72H
7F76             00122 ADD      EQU     07F76H
7F7A             00123 SUB      EQU     07F7AH
7F7E             00124 TEST     EQU     07F7EH
7F8A             00126 JLOOKA   EQU     7F8AH
0000 DD21D06A    00200          LD      IX,TB
0004 0601        00300          LD      B,1
0006 05          00400          DEC     B
0007 0E06        00500          LD      C,6
                 00550 ;--------------
0009 1E01        00600 LOOKA    LD      E,1
000B 1D          00700          DEC     E
000C 53          00800          LD      D,E
000D D5          00900          PUSH    DE
000E CD6E7F      01000          CALL    INIT;
0011 CD7E7F      01100          CALL    TEST
0014 3A8A6B      01200          LD      A,(NA)
0017 B7          01300          OR      A
0018 2812        01400          JR      Z,LOOKB
001A FE02        01500          CP      2
001C 280A        01600          JR      Z,ABLDR
001E 303E        01700          JR      NC,LOOKD
0020 3E01        01800          LD      A,1
0022 CD727F      01900          CALL    SAVE
0025 B7          02000          OR      A
0026 1804        02100          JR      LOOKB
0028 D1          02200 ABLDR    POP     DE
0029 1601        02300          LD      D,1
002B D5          02400          PUSH    DE
                 02450 ;--------------
002C CD7E7F      02500 LOOKB    CALL    TEST
002F 3A8A6B      02600          LD      A,(NA)
0032 B7          02700          OR      A
0033 2811        02800          JR      Z,LOOKC
0035 FE02        02900          CP      2
0037 2809        03000          JR      Z,BBLDR
0039 3023        03100          JR      NC,LOOKD
003B 3E02        03200          LD      A,2
003D CD727F      03300          CALL    SAVE
0040 1804        03400          JR      LOOKC
0042 D1          03500 BBLDR    POP     DE
0043 1E01        03600          LD      E,1
0045 D5          03700          PUSH    DE
                 03750 ;--------------
0046 79          03800 LOOKC    LD      A,C
0047 FE06        03900          CP      6
0049 2813        04000          JR      Z,LOOKD
004B FE03        04100          CP      3
004D 280F        04200          JR      Z,LOOKD
004F CD7E7F      04300          CALL    TEST
0052 3A8A6B      04400          LD      A,(NA)
0055 FE01        04500          CP      1
0057 2005        04600          JR      NZ,LOOKD
0059 3E03        04700          LD      A,3
005B CD727F      04800          CALL    SAVE
                 04850 ;--------------
005E CD6E7F      04900 LOOKD    CALL    INIT;
0061 D1          05000          POP     DE
0062 1E01        05100          LD      E,1
0064 1D          05200          DEC     E
0065 D5          05300          PUSH    DE
0066 CD7E7F      05400          CALL    TEST
0069 CD767F      05500          CALL    ADD
006C CD7E7F      05600          CALL    TEST
006F CD7A7F      05700          CALL    SUB
0072 3A8A6B      05800          LD      A,(NA)
```



```
0075 B7          05900          OR      A
0076 2811        06000          JR      Z,LOOKE
0078 FE02        06100          CP      2
007A 2809        06200          JR      Z,DBLDR
007C 304A        06300          JR      NC,EDGE
007E 3E02        06400          LD      A,2
0080 CD727F      06500          CALL    SAVE
0083 1804        06600          JR      LOOKE
0085 D1          06700 DBLDR    POP     DE
0086 1E01        06800          LD      E,1
0088 D5          06900          PUSH    DE
                 06950 ;--------------
0089 79          07000 LOOKE    LD      A,C
008A FE06        07100          CP      6
008C 2812        07200          JR      Z,LOOKF
008E FE03        07300          CP      3
0090 280E        07400          JR      Z,LOOKF
0092 CD7E7F      07500          CALL    TEST
0095 3A8A6B      07600          LD      A,(NA)
0098 BF          07700          CP      A
0099 2005        07800          JR      NZ,LOOKF
009B 3E03        07900          LD      A,3
009D CD727F      08000          CALL    SAVE
                 08050 ;--------------
00A0 79          08100 LOOKF    LD      A,C
00A1 FE02        08200          CP      2
00A3 2823        08300          JR      Z,EDGE
00A5 B7          08400          OR      A
00A6 FE05        08500          CP      5
00A8 281E        08600          JR      Z,EDGE
00AA CD6E7F      08700          CALL    INIT;
00AD CD7E7F      08800          CALL    TEST
00B0 CD767F      08900          CALL    ADD
00B3 CD7E7F      09000          CALL    TEST
00B6 CD7E7F      09100          CALL    TEST
00B9 CD7A7F      09200          CALL    SUB
00BC 3A8A6B      09300          LD      A,(NA)
00BF FE01        09400          CP      1
00C1 2005        09500          JR      NZ,EDGE
00C3 3E03        09600          LD      A,3
00C5 CD727F      09700          CALL    SAVE
                 09750 ;--------------
                 09752 ;CHECK FOR FINISH
                 09754 ;IF SO, SEVEN TIMES
                 09756 ;NO. OF RECORDS GOES
                 09760 ;INTO TB(0)
                 09762 ;--------------
00C8 D1          09800 EDGE     POP     DE
00C9 0D          09900          DEC     C
00CA C28A7F      10000          JP      NZ,JLOOKA
00CD DDE5        10100          PUSH    IX
00CF E1          10200          POP     HL
00D0 11D06A      10300          LD      DE,TB
00D3 AF          10400          XOR     A
00D4 ED52        10500          SBC     HL,DE
00D6 7D          10600          LD      A,L
00D7 32D06A      10700          LD      (TB),A
00DA C9          10800          RET
0000             12300          END
00000 TOTAL ERRORS
33217  TEXT AREA BYTES LEFT
```

COMBAT SEQUENCE

Once all movement is complete, a check will be made for possible attacks. Different parts of the screen are flashed on the screen as the search is made. When a piece is found that has opponents within range, a letter will be placed to the right of each defender. There are two types of combat:

1. ATTACKING AT ONE HEX RANGE

This is compulsory. If there is only one defender the attack takes place automatically. If there is more than one, the piece will flicker "WHO", to which you must reply with one of the letters appearing on the screen. The result of the attack will appear at the bottom of the screen. Tomahawks may only attack at one hex range.

2. ATTACKING AT TWO OR THREE HEX RANGE

This is optional. If you do not wish to attack, press "ENTER"

DEFENCE

A defender is permitted to return the fire once during the attack sequence. This is compulsory at one hex, but at two or more the piece will flicker "RTN". If you wish to return the fire, press "Y" or else press any other key. Having replied, there will be no defence in further attacks.

ADD REGISTER

```
0000             00010          ORG     0
                 00011 ;X$(12) - ADD
                 00012 ;=================
                 00013 ;ADD 1 TO REGISTER C.
                 00014 ;MOD 6
                 00015 ;=================
                 00018 ;
0000 0C          00020          INC     C
0001 79          00030          LD      A,C
0002 FE07        00040          CP      7
0004 3802        00050          JR      C,SEVEN
0006 0E01        00060          LD      C,1
0008 C9          00070 SEVEN    RET
0000             00080          END
00000 TOTAL ERRORS
34884  TEXT AREA BYTES LEFT
```

SUBTRACT

```
0000             00010          ORG     0
                 00011 ;X$(13) - SUB
                 00012 ;===============
                 00013 ;SUBTRACT 1 FROM C
                 00014 ;MOD 6
                 00015 ;===============
                 00016 ;
0000 0D          00020          DEC     C
0001 3E01        00030          LD      A,1
0003 3D          00040          DEC     A
0004 B9          00050          CP      C
0005 2002        00060          JR      NZ,ZERO
0007 0E06        00070          LD      C,6
0009 C9          00080 ZERO     RET
0000             00120          END
00000 TOTAL ERRORS
34884  TEXT AREA BYTES LEFT
```

The movement routine is complete. Now we must approach the much more difficult part of the program which takes care of the combat. This occurs immediately the player has completed all moves. This article is devoted entirely to machine language routines. Next we will develop and complete the Basic portion so that you will see how they fit together.

The combat sequence involves examining up to 30 hex around each man looking for opponents. A diagram of this area is shown in figure 1. You will see that I have divided it up into 6 segments and labelled the hex in each A, B, C, D, E and F.

There are, of course, really 36 hex but because the hex is elongated due to the shape of the video pixel, one finds that a distance of three hex North or South is unrealistically far, so the top and bottom hex are ignored. If you want to have them, the adjustment is easy.

At this point, we must get into some heavy machine code. In order to make an attack, we need to know several facts about the opponent i.e.

1. His position on the screen. (2 bytes)
2. The position of boulders which provide cover. (2 bytes)
3. The distance between the two pieces.
4. The index of the defender.
5. The direction of the attack.

When we come out of the X$(16) routine we will have this information in a table called TB. The first byte in this will



Illustration: John Davis

WARPATH

No wargame is complete without a good battle. In part six of his Warpath game, Ron Potkin tackles the combat routines as the cavalry and the braves move to adjacent hexes.

contain the length which we divide by seven to obtain the number of defenders.

The code in X$(16) calls five subroutines held in X$(10) through to X$(14). Some of these are very simple and I could have repeated the coding in the X$(16), but the length would have exceeded the maximum which can be held in one string.

Incidentally, this routine was first written and tested in Basic and then translated. For example:

```
X$(12)...C = C + 1
         IF C = 7 THEN C = 1
         RETURN

X$(13)...C = C - 1
         IF C = 0 THEN C = 6
         RETURN
```

I prefer this method. The idea is that I can get the logic correct in Basic so that, when writing the machine code, I need only concentrate on the syntax. It looks complicated because machine code requires that you work at a much greater level of detail. Let me outline what happens:

1. Register BC counts the number of segments i.e. 6 (see lines 300-500 of RANGE). This is also the direction indicator. Assume that BC equals 1.
2. Register D contains 1 if we are checking a near boulder hex (A). Register E contains 1 if it is a far hex (B or D). These will be stored in the table if a boulder is found.
3. The routine TEST uses BC to obtain the offset. This gets us to A. It calculates the IBOARD and VIDEO positions as it proceeds. If there is a defender here, we need to look no further because the attack is compulsory.
4. Now we continue up to hex B and C using the same offset. Any defenders are saved in TB. We now go back to the start (using INIT). We call TEST which takes us to A and then increment C and call TEST again which takes us to D. Similar methods are used to reach E and F.

Just one point: the routines use the same names as the Basic program. This was necessary in order to stop my head going in circles! Do not confuse the two.

The six subroutines are in this month's listing. As usual, load the tape containing Parts 1 to 5 before you start. Sorry: there are several lines of numbers — so take it easy. Type in a few lines at a time and save at regular intervals. You will see that I have adjusted lines 4000 to 4020 which will check that the DATA is correct. Make sure that the X$ strings are the following lengths:

X$(	10	11	12	13	14	16
Length	17	46	9	10	128	220

Once you have RUN this program, delete lines 791, 1085/6 and all lines from 2000 upwards. The only code remaining should be up to 1690 in multiples of 10. Now save this as well. You will be pleased to know that this completes all machine code — the remainder is now in Basic.

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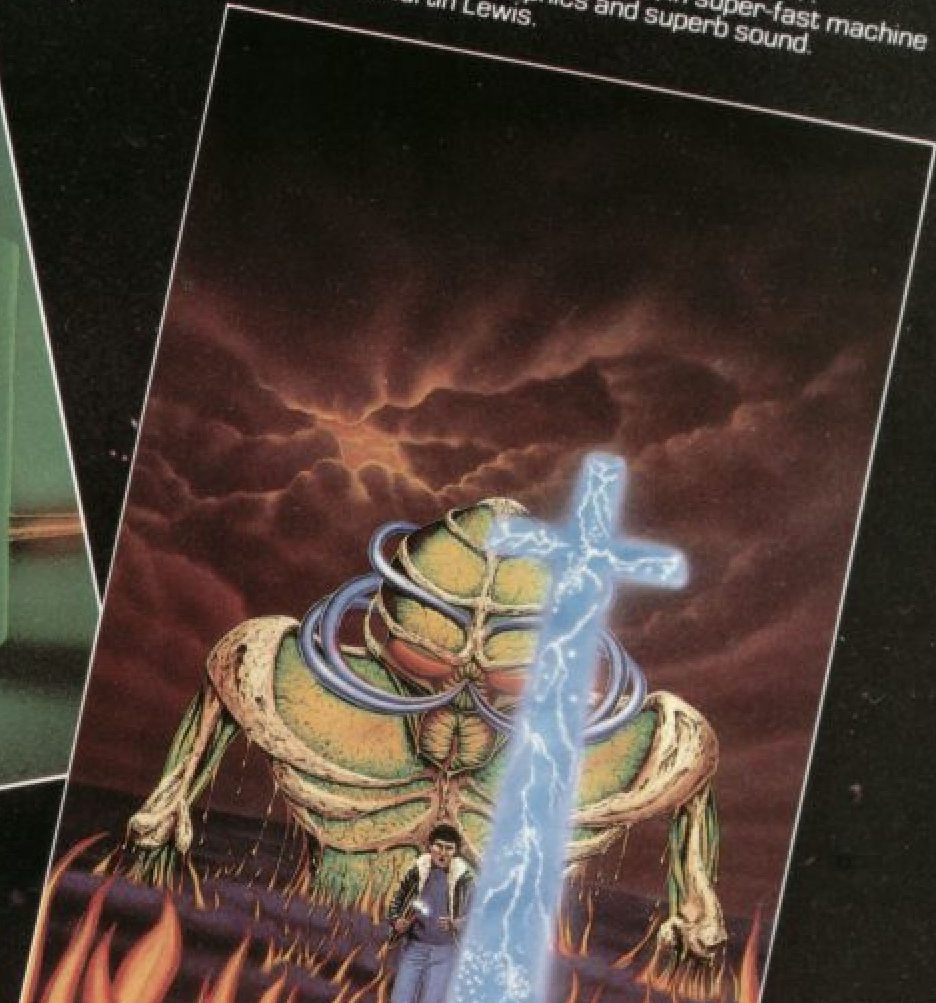


MEGAPEDE

No matter how fast I fired, the Megapede kept on coming! I was gaining ground, though, when suddenly the Spider appeared on collision course zero! Turn–dodge–I out-manoeuvred, I blasted him. But just then Scorpi appeared dropping her indestructible fleas . . . Nine levels of play plus high score 100% machine code. Full colour and sensational sounds. Rated by T.V. Choice as "a superb rendering of the popular arcade game". Realisation: Andrew Beale.

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CONTENTS AND UPDATE

```
0000            00010           ORG     0
                00020 ;X$(14) TEST
                00030 ;================================
                00040 ;FIND CONTENTS OF HEX DEFINED BY
                00050 ;BL AND DIRECTION GIVEN BY REG. C
                00060 ;RETURNS NA: EDGE = 3, BOULDER = 2
                00070 ;        OPPONENT  = 1, OTHER   = 0
                00080 ;ALSO UPDATES BL AND PR TO HEX POSITION
                00090 ;================================
6B88            00092 PR        EQU     27528D
6B84            00093 BL        EQU     27524D
6B98            00094 RW        EQU     27544D
6B8A            00095 NA        EQU     27530D
6B81            00096 NX        EQU     27521D
7BB5            00097 BD        EQU     31669D
6B8B            00098 SK        EQU     27531D
6B8C            00099 VID       EQU     27532D
                00100 ;
                00110 ;CALCULATE NEW PR FROM OFFSETS
                00120 ;SEE RW IN BASIC - LINE990
                00130 ;SIMILAR TO ROUTINE IN LINE 500
                00140 ;-------------------------------
0000 218C6B     00150           LD      HL,VID
0003 2B         00160           DEC     HL
0004 2B         00170           DEC     HL
0005 09         00180           ADD     HL,BC
0006 09         00190           ADD     HL,BC
0007 5E         00200           LD      E,(HL)
0008 23         00210           INC     HL
0009 56         00220           LD      D,(HL)
000A 2A886B     00230           LD      HL,(PR)
000D 19         00240           ADD     HL,DE
000E EB         00250           EX      DE,HL
000F ED53886B   00260           LD      (PR),DE
0013 EB         00270           EX      DE,HL
                00271 ;=============================
                00272 ;CALCULATE HEX
                00273 ;SIMILAR TO ROUTINE IN X$(4)
                00274 ;=============================
0014 2A846B     00280           LD      HL,(BL)
0017 1601       00290           LD      D,1
0019 15         00300           DEC     D
001A 1E18       00310           LD      E,24D
001C AF         00320           XOR     A
001D ED52       00330 SUBT      SBC     HL,DE
001F 3803       00340           JR      C,ROW
0021 3C         00350           INC     A
0022 18F9       00360           JR      SUBT
0024 E601       00370 ROW       AND     1
0026 21986B     00380           LD      HL,RW
0029 2803       00390           JR      Z,EVEN
002B 1E0C       00400           LD      E,12D
002D 19         00410           ADD     HL,DE
002E 09         00420 EVEN      ADD     HL,BC
002F 09         00430           ADD     HL,BC
0030 2B         00440           DEC     HL
0031 2B         00450           DEC     HL
                00455 ;--------------
                00456 ;ASSUME HEX IS
                00457 ;VACANT
0032 3E01       00460           LD      A,1
0034 3D         00470           DEC     A
0035 328A6B     00480           LD      (NA),A
                00482 ;--------------
                00484 ;UPDATE BL
                00486 ;--------------
0038 5E         00490           LD      E,(HL)
0039 23         00500           INC     HL
003A 56         00510           LD      D,(HL)
003B EB         00520           EX      DE,HL
003C ED5B846B   00530           LD      DE,(BL)
0040 19         00540           ADD     HL,DE
0041 EB         00550           EX      DE,HL
0042 ED53846B   00560           LD      (BL),DE
0046 EB         00570           EX      DE,HL
0047 AF         00580           XOR     A
0048 11B57B     00590           LD      DE,BD
004B 19         00600           ADD     HL,DE
                00602 ;=============
                00604 ;GOT IT !
                00606 ;=============
004C 7E         00610           LD      A,(HL)
004D 32816B     00620           LD      (NX),A
0050 FE63       00630           CP      99D
0052 2824       00640           JR      Z,EDGE
0054 FE3C       00650           CP      60D
0056 2824       00660           JR      Z,BLDR
0058 FE33       00670           CP      51D
005A 301B       00680           JR      NC,OTHER
                00682 ;--------------
                00684 ;WE HAVE A MAN.
                00686 ;FRIEND OR FOE?
                00688 ;--------------
005C 11FFFF     00690           LD      DE,0FFFFH
005F FE1A       00700           CP      26D
0061 3802       00710           JR      C,LESS1
0063 1E01       00720           LD      E,1
0065 3A8B6B     00730 LESS1     LD      A,(SK)
0068 FE1A       00740           CP      26D
006A 3802       00750           JR      C,LESS2
006C 1601       00760           LD      D,1
006E 7A         00770 LESS2     LD      A,D
006F BB         00780           CP      E
0070 2805       00790           JR      Z,OTHER ;FRIEND
0072 3E01       00800           LD      A,1 ;FOE
0074 328A6B     00810 PUTNA     LD      (NA),A
0077 C9         00820 OTHER     RET
0078 3E03       00830 EDGE      LD      A,3
007A 18F8       00840           JR      PUTNA
007C 3E02       00850 BLDR      LD      A,2
007E 18F4       00860           JR      PUTNA
0000            01030           END
00000 TOTAL ERRORS
33191 TEXT AREA BYTES LEFT
```

POSITION OF ENEMY

```
0000            00010           ORG     0
                00011 ;X$(11) - SAVE
                00015 ;======================
                00020 ;ADDS DETAILS ON POSITION
                00025 ;OF ENEMY TO TABLE
                00027 ;======================
                00030 ;
6B88            00040 PR        EQU     27528D
6B81            00050 NX        EQU     27521D
0000 2A886B     00060           LD      HL,(PR)         ;VIDEO
0003 DD7401     00070           LD      (IX+01H),H      ;POSITION
0006 DD7502     00080           LD      (IX+02H),L      ;GET RETURN ADDRESS
0009 E1         00090           POP     HL              ;GET BLDR FLAG
000A D1         00100           POP     DE
000B D5         00110           PUSH    DE              ;SAVE ADDRESS
000C E5         00120           PUSH    HL              ;DISTANCE 1,2,3
000D DD7706     00130           LD      (IX+06H),A
0010 3A816B     00140           LD      A,(NX)
0013 DD7705     00150           LD      (IX+05H),A
;PIECE INDEX
0016 DD7203     00160           LD      (IX+03H),D
;BLDR NEAR ATT.
0019 DD7304     00170           LD      (IX+04H),E
;BLDR NEAR DEF.
001C DD7107     00180           LD      (IX+07H),C
;DIRECTION 1-6
001F DD23       00190           ING     IX
;ADD 7 TO INDEX
0021 DD23       00200           INC     IX
0023 DD23       00210           INC     IX
0025 DD23       00220           INC     IX
0027 DD23       00230           INC     IX
0029 DD23       00240           INC     IX
002B DD23       00250           INC     IX
002D C9         00260           RET
0000            00290           END
00000 TOTAL ERRORS
34459 TEXT AREA BYTES LEFT
```



TEMPORARY VARIABLES

```
0000            00010           ORG     0
                00020 ;X$(10) - INIT.
                00025 ;==================
                00030 ;SB IS SP, SS IS BL
                00035 ;SEE BASIC LINE 1230
                00040 ;THIS SETS UP THE
                00045 ;TEMPORARY VARIABLES
                00050 ;PR & BL
                00055 ;==================
                00060 ;
6B82            00070 SB        EQU     27522D
6B84            00080 BL        EQU     27524D
6B86            00090 SS        EQU     27526D
6B88            00100 PR        EQU     27528D
0000 ED5B826B   00110           LD      DE,(SB)
0004 ED53846B   00120           LD      (BL),DE
0008 ED5B866B   00130           LD      DE,(SS)
000C ED53886B   00140           LD      (PR),DE
0010 C9         00150           RET
0000            00160           END
00000 TOTAL ERRORS
34741 TEXT AREA BYTES LEFT
```



WARPATH — PART 6 — RANGE

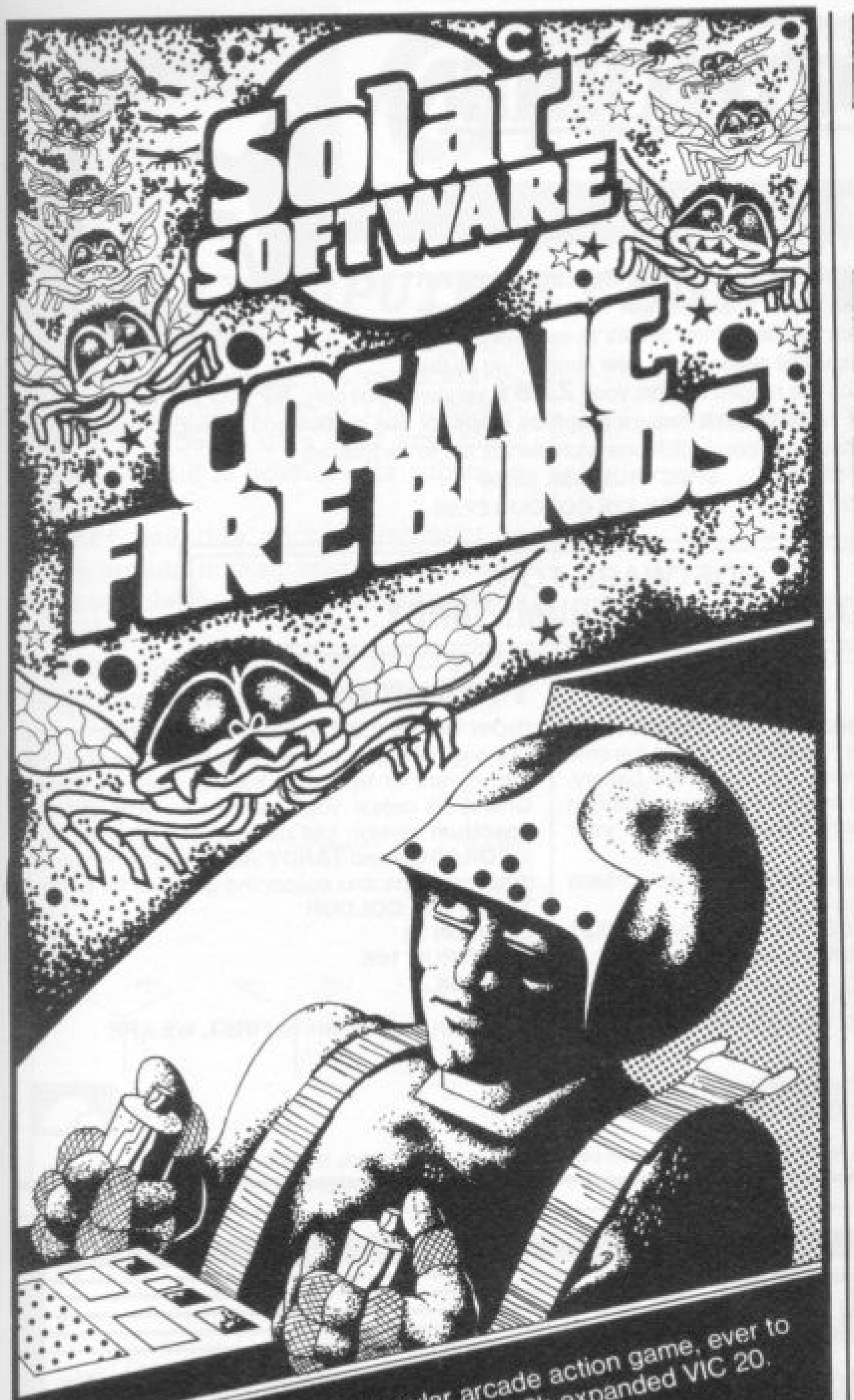
```
791 GOSUB3040   'DELETE LATER
1600 'LETTER DEFENDERS
1610 X$(10)="AAAAAAAAAABBBBBBB"
1620 X$(11)="AAAAAAAAAABBBBBBBBBBCCCCCCCCCCDDDDDDDDDDEEEEEE"
1630 X$(12)="AAAAAAAA"
1640 X$(13)="AAAAAAAAA"
1650 X$(14)="AAAAAAAAAABBBBBBBBBBCCCCCCCCCCDDDDDDDDDDEEEEEEEEEEF
FFFFFFFFFGGGGGGGGGGHHHHHHHHHHIIIIIIIIIIJJJJJJJJJJKKKKKKKKKKLLLLL
LLLLLMMMMMMMM"
1660 X$(16)="AAAAAAAAAABBBBBBBBBBCCCCCCCCCCDDDDDDDDDDEEEEEEEEEEF
FFFFFFFFFGGGGGGGGGGHHHHHHHHHHIIIIIIIIIIJJJJJJJJJJKKKKKKKKKKLLLLL
LLLLLMMMMMMMMMMNNNNNNNNNNOOOOOOOOOOPPPPPPPPPPQQQQQQQQQQRRRRRRRRR
RSSSSSSSSSSTTTTTTTTTTUUUUUUUUUUVVVVVVVVVV"
1670 ' This line contains graphics for wigwams - not included.
1680 PRINT@712,"WARPATH";:PRINT@774,"BY RON POTKIN";
3040 DATA ED,5B,82,6B,ED,53,84,6B,ED,5B,86,6B,ED,53,88,6B
3041 DATA C9,XX
3042 DATA 2A,88,6B,DD,74,01,DD,75,02,E1,D1,D5,E5,DD,77,06
3043 DATA 3A,81,6B,DD,77,05,DD,72,03,DD,73,04,DD,71,07,DD
3044 DATA 23,DD,23,DD,23,DD,23,DD,23,DD,23,DD,23,C9,XX
3045 DATA 0C,79,FE,07,38,02,0E,01,C9,XX
3046 DATA 0D,3E,01,3D,B9,20,02,0E,06,C9,XX
3047 DATA 21,8C,6B,2B,2B,09,09,5E,23,56,2A,88,6B,19,EB,ED
3048 DATA 53,88,6B,EB,2A,84,6B,16,01,15,1E,18,AF,ED,52,38
3049 DATA 03,3C,18,F9,E6,01,21,98,6B,28,03,1E,0C,19,09,09
3050 DATA 2B,2B,3E,01,3D,32,8A,6B,5E,23,56,EB,ED,5B,84,6B
3051 DATA 19,EB,ED,53,84,6B,EB,AF,11,B5,7B,19,7E,32,81,6B
3052 DATA FE,63,28,24,FE,3C,28,24,FE,33,30,1B,11,FF,FF,FE
3053 DATA 1A,38,02,1E,01,3A,88,6B,FE,1A,38,02,16,01,7A,BB
3054 DATA 28,05,3E,01,32,8A,6B,C9,3E,03,18,F8,3E,02,18,F4
3055 DATA XX
3056 DATA DD,21,D0,6A,06,01,05,0E,06,1E,01,1D,53,D5,CD,6E
3057 DATA 7F,CD,7E,7F,3A,8A,6B,B7,28,12,FE,02,28,0A,30,3E
3058 DATA 3E,01,CD,72,7F,B7,18,04,D1,16,01,D5,CD,7E,7F,3A
3059 DATA 8A,6B,B7,28,11,FE,02,28,09,30,23,3E,02,CD,72,7F
3060 DATA 18,04,D1,1E,01,D5,79,FE,06,28,13,FE,03,28,0F,CD
3061 DATA 7E,7F,3A,8A,6B,FE,01,20,05,3E,03,CD,72,7F,CD,6E
3062 DATA 7F,D1,1E,01,1D,D5,CD,7E,7F,CD,76,7F,CD,7E,7F,CD
3063 DATA 7A,7F,3A,8A,6B,B7,28,11,FE,02,28,09,30,4B,3E,02
3064 DATA CD,72,7F,18,04,D1,1E,01,D5,79,FE,06,28,13,FE,03
3065 DATA 28,0F,CD,7E,7F,3A,8A,6B,FE,01,20,05,3E,03,CD,72
3066 DATA 7F,79,FE,02,28,23,B7,FE,05,28,1E,CD,6E,7F,CD,7E
3067 DATA 7F,CD,76,7F,CD,7E,7F,CD,7E,7F,CD,7A,7F,3A,8A,6B
3068 DATA FE,01,20,05,3E,03,CD,72,7F,D1,0D,C2,8A,7F,DD,E5
3069 DATA E1,11,D0,6A,AF,ED,52,7D,32,D0,6A,C9,XX
4000 LN$=".. 17 46  9 10128220"
4005 CS$=".... 2457 5836  668  5771170923360"
4010 XN$=".101112131416"
4020 K=0:FOR XN=2 TO LEN(XN$) STEP2:I=VAL(MID$(XN$,XN,2)):J=VAL(
MID$(LN$,3*XN/2,3)):IFJ<>LEN(X$(I))THENGOSUB4040:NEXTELSENEXT
5000 FOR XN=2 TO LEN(XN$) STEP2: I=VAL(MID$(XN$,XN,2))
5020 CS%=VAL(MID$(CS$,5*XN/2,5)):LN=VAL(MID$(LN$,3*XN/2,3)):SUM=
0:J=0:V=I:GOSUB440
5130 NEXT XN
```



Fig 1

WARPATH

to be continued next month



This must be the most spectacular arcade action game, ever to be produced on cassette for the 8 or 16k expanded VIC 20.

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* From the author of Spectrum 'Scramble' *
* 100% machine code *

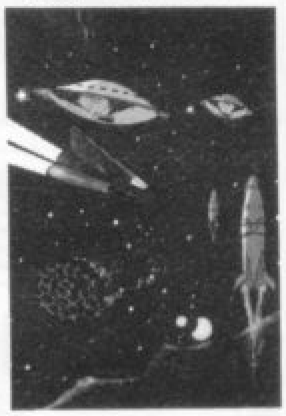


SPACE ZOMBIES (16K) £5,95

Shooting through space you are ambushed by a fleet of Space Zombies flying at you in formation, swooping and diving at you. Destroy them, if you can! But in destroying them, you attract more to the area, and the game gets progressively harder.

* Full screen hi-res graphics *
* 1 or 2 players * Joystick option *
*Full sound and colour *
*Three playing speeds *

MINES OF SATURN and RETURN TO EARTH £5,95
(16K) Text Adventure



Mines of Saturn While piloting a routine orbit of Saturn, you are caught up in a radiation storm which forces you into the giant planet's rings. Your energy drained, you make a forced landing on the planet's surface. Luckily you crashed near an abandoned mining base and you set off in search of some di-lithium crystals to refuel your stranded space ship. Can you do it?

Return to Earth Having escaped from your previous dilemmas, you reach Earth Station 1, but fail to make radio contact. You effect a safe if harrowing manual docking. On entry you find it deserted, and the control room destroyed. You must explore the station and find some way to alert Earth of your predicament, but beware, many of the rooms are identical, there is extensive damage, and signs of alien intruders.

Graphic Adventure (48K)



MAD MARTHA £6,95

Poor little Henry is the hen-pecked hero of this domestic tale. One night he can take no more. He steals his wages from his wife's purse, sneaks out of the house being careful not to wake the baby or trip over the cat, and heads for the bright lights to have some fun. Trouble is he runs out of money. His only way to raise some cash is to gamble his few remaining pounds on the spinning wheel of the roulette table. Just as Henry is getting into his evening his wife — Mad Martha — has noticed his absence. Realising Henry has absconded with the housekeeping she sets out after him with an axe. Guess what part you play in this happy tale? That's right, you're Henry. Watch out for that axe!

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SOFTWARE FOR
ATARI: DRAGON: SPECTRUM: TANDY: ZX81

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THE EMPIRE NOW STRETCHES TO THE ATARI
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DRAGON 32	£6.95
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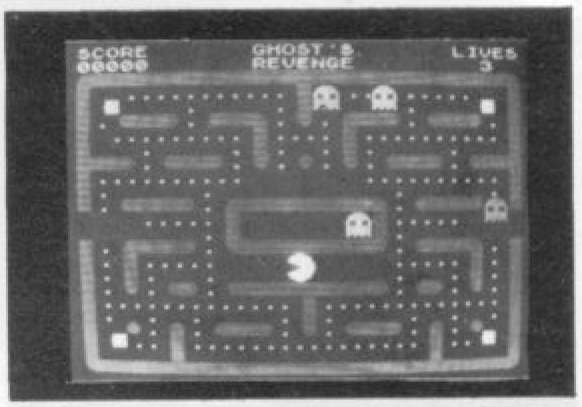
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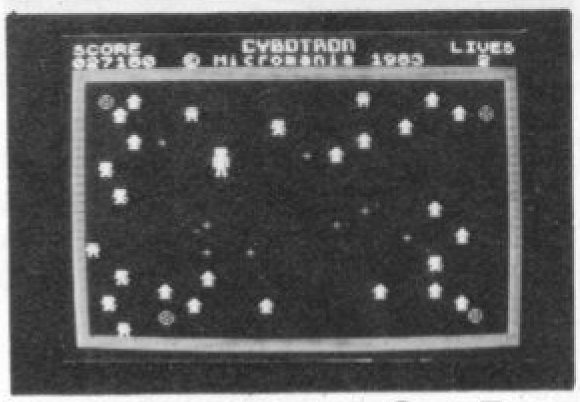
by Dominic Wood



The best maze-chaser game available for the Spectrum *Super-fast machine code action *Excellent graphics *Full use of colour *Sound effects and tunes *Normal or Invisible maze *Skill level selector, novice to expert; this game cannot be beaten *Usual features, gobble action, four ghosts, power pods that turn the ghosts blue, blue ghosts give 400, 800, 1200, 1600 bonus points. Top score, for Spectrum 16k or 48k. ONLY £5.95

NEW! CYBOTRON

by Dominic Wood



New from Micromania, this has to be one of the best arcade type games available for the Spectrum. Blast away the attacking robots before they get you *Super-fast 100% machine code action *Excellent, smooth full colour graphics *Explosive sound effects *Four different types of robots *Deadly accurate bombs *With up to 50 robots on screen at a time, this game cannot be beaten. Top score, for Spectrum 16k or 48k. ONLY £5.95

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GRAPHICS

By Garry Marshall

NOW COMPUTERS CAN "SEE"

Most modern day robots look nothing like those science-fiction monsters — all metal and malevolence. Our conception of a robot is of a deaf and blind slave — but it is possible for robots to "see".

They use this accomplishment to move around in their environments and to assemble the parts making up fairly complex items.

A computer "sees" in exactly the same way that it does everything else — by running a program. In this case it must be presented in some way with an image of what it is seeing and run a program which can tell it what this image means.

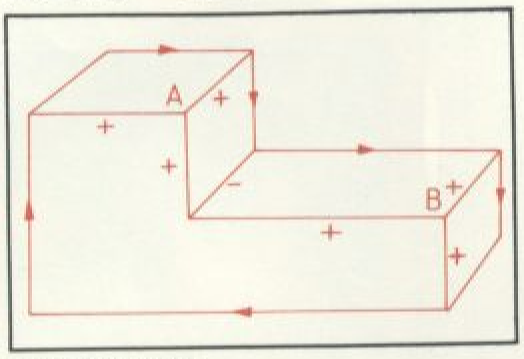


FIG 1: LABELLINGS

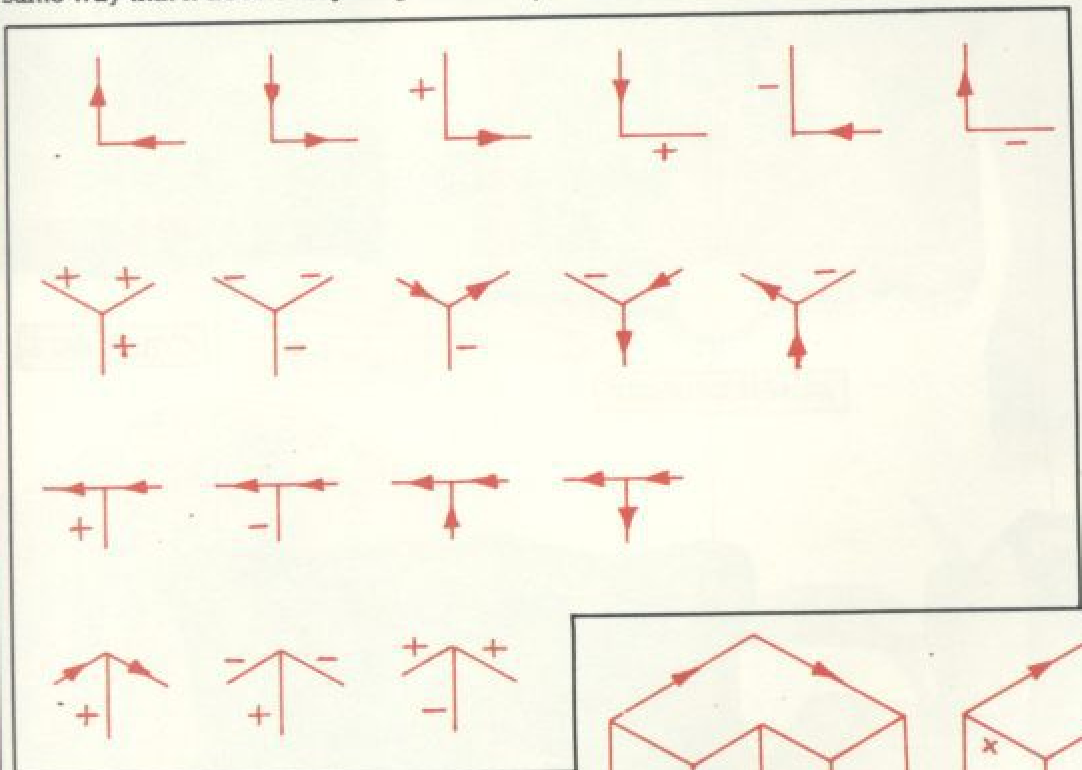


FIG 2: CORNER LABELLINGS

The image can be presented by a video camera. However, it is a task beyond the current state of the art to interpret raw video pictures directly.

If such pictures are first processed to reduce them to line drawings, then it is a quite straightforward matter to interpret them.

In this article I'll explain how line drawings of three-dimensional objects can be interpreted so that a computer can be programmed to know what it is seeing. Next I will examine how ordinary pictures of an object can be reduced to line drawings.

In a line drawing of a three-dimensional object, each line can represent one of the following

(a) An edge projecting *outwards* at the join of two surfaces. Such lines are indicated by labelling them with a '+'.

(B) An edge projecting *inwards* at the join of two surfaces. Such lines are indicated by representing them with a '–'.

(c) An edge at which one of the surfaces hides another. Such lines are labelled with an arrow. The direction of the arrow is such that when walking along the edge the surface which hides the other is always to the right.

These labellings are illustrated in figure 1. A brief examination of the diagram will show that the shape which you automatically assign to the object that is represented in the figure is confirmed by the labelling of the lines.

Having seen that the labelling corresponds with the way that we see an object, what is needed now is a procedure for automatically labelling any line drawing of a three-dimensional object.

The labelling can then be done by a program, and once the labelling is done, the shape of the object can be understood.

The key to doing the labelling automatically is in the way that the corners where edges meet can be labelled. The corners marked A and B in figure 1, for example, both show three converging edges all of which are labelled with '+', so that they are projecting outwards to form a corner of the kind possessed by a cube.

In fact, there are 18 permitted ways for labelled edges to converge at a corner. They are all illustrated in figure 2. All other possible corner labellings correspond to situations that are physically impossible.

With the aid of this list of valid corner labellings, we can give a method for the automatic labelling of a line drawing. It is:

1. Label the perimeter of the drawing with arrows forming a clockwise ring.
2. Complete the corners on the outside with corner labellings selected from figure 2.
3. Work inwards to label the remaining corners with valid labellings until the labelling is complete.

These three phases are illustrated in figure 3. Step 3 required two passes in the figure illustrated.

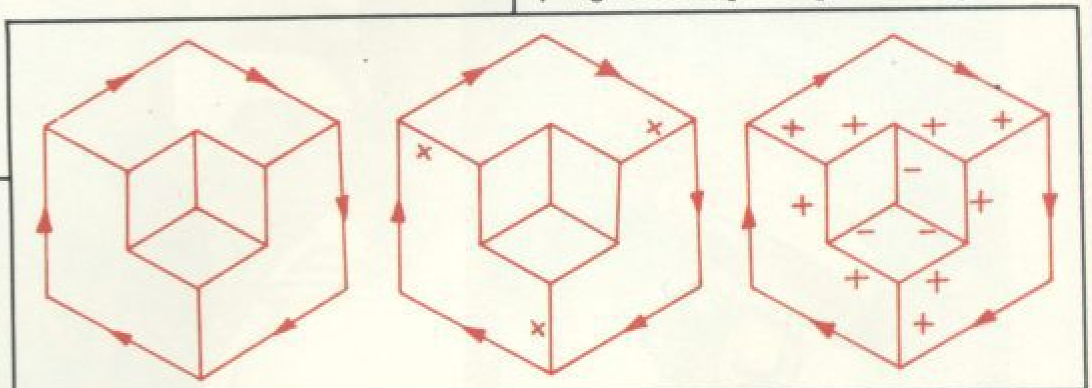


FIG 3: THE THREE PHASES

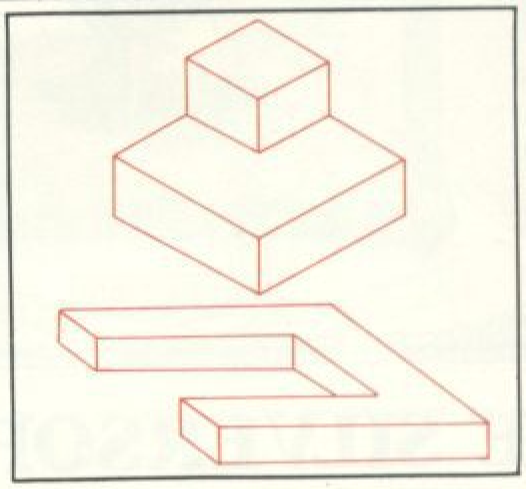


FIG 4: EXAMPLES

You might care to try your hand at the examples in figure 4, and to test the results by comparing them with the way that you see the objects.



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MACHINE CODE

We have not yet covered all the different types of machine code instruction, but we have looked at enough instructions to be able to write some useful routines.

Instead of looking at new instructions this month we will look at how to use the routines built in to the computer's ROM in conjunction with the instructions we already know.

ROUTINES AND HARDWARE

All computers have built in routines to handle such basic operations as printing a character, reading the keyboard, tape input and output, etc.

The details of these routines depend on the hardware of the particular computer, and they are usually quite complicated.

For example, the routine to print a character on the screen has to produce the actual dot pattern for the character, keep track of the cursor position, provide automatic carriage return/line feed at the end of each line, provide automatic scrolling at the end of the screen, and also has to handle various non-printing control codes.

Before you can use these routines in your own programs you need to find their memory addresses and how to pass values between these ROM routines and your program.

The manual for the BBC micro gives details of how to use several ROM routines, but with most small computers you have to rely on what users have found out for themselves and published in magazines or books.

PRINTING THE MESSAGES . . .

In the example programs printed here I will assume that to print a character on the screen you have to get the ASCII code for the character into the accumulator and call a subroutine called OUTCH, and I will also be assuming that OUTCH does not alter any of the registers. Most computers do have a routine that works like this.

Suppose we have a message stored in the computer's memory, and we want to print the message on the screen.

We need to know the address where the message starts, which we will call MESSGE (abbreviated because assemblers normally allow only six characters), and where the message ends.

There are several methods you can use to indicate the end of a message, for example, put zero after the last character, or add 128 to the code for the last character (this will not usually cause any confusion as the codes for the normal printing characters are less than 128).

The examples here mostly assume that you know the actual length of the message and the routines count the number of characters printed. The form of the routines is:

Initialise pointers
Repeat
  Read character
  Print character
  Advance pointer
Until end of message

We can now look at the routines in detail.

LETS GO FOR A LOOP!

6502

Routine (a) is quite simple: we use the X register as a pointer and load the character to be printed into the accumulator using absolute indexed addressing.

The character is printed by calling the ROM subroutine OUTCH, and we then increment the X register to point to the next character and compare the value in the X register with the length of the message.

If the value in the X register is not equal to the length of the message we loop back to process the next character.

Routine (a) can only be used when the message is less than 256 characters long, as the registers in the 6502 are only 8-bits long.

If the message is more than 256 characters we can use routine (b), which is more complicated as we have to handle 16-bit numbers in two 8-bit sections. The characters of the message are read into the accumulator using indirect indexed addressing (or post-indexing).

This requires the base address to be stored in two consecutive page zero locations, which are called MESSAD and MESSAD+1 in the routine.

The first few lines in routine (b) calculate some constants which are used later. A standard 6502 assembler will allow calculations of this type, and will also allow the calculations to be performed in operands.

The numbers involved in the arithmetic must be between 0 and 65535, and division always returns an integer result, any fractional part being discarded.

Thus, if MESSGE were $1234, the first two lines of routine (b) would give MESSHI as $12 and MESSLO as $34, separating the address into its high and low bytes.

After the initial calculations routine (b) puts the low and high bytes of MESSGE into the page zero locations MESSAD and MESSAD+1, and sets the Y register to zero.

After a character has been printed the pointer is advanced by incrementing the contents of memory location MESSAD (the low byte) and if the low byte becomes zero the high byte also has to be incremented.

The test for the end of the message also has to be done in two parts. The high byte of the current address is compared with the high byte of the address of the end of the message (which was calculated at the beginning); if they are not equal the routine loops back to process the next character; if they are equal the low bytes have to be tested.

DEFICIENCIES OF THE Z80 SET

Z80

Routine (c) uses the HL register pair as a pointer to the current character and the B register as a counter for the number of characters. Note that, as the compare instruction CP performs a comparision with the accumulator, the contents of the B register are copied into the accumulator in order to perform the comparison.

The B register is 8-bits long, so routine (c) can only be used if the message is less than 256 characters.

Routine (d) will handle messages with more than 256 characters. The BC register pair is initially loaded with the address of the end of the message and after a character has been printed and the HL pointer incremented the routine tests to see if the contents of HL are equal to the contents of BC.

The test is a little complicated because of deficiencies in the Z80 instruction set.

The Z80 has no 16-bit compare instruction. However, you will remember that a compare instruction works by performing a subtraction, and keeps the

BY TED BALL

ROUTINE (a) — 6502

```
        LDX #0
NEXTCH  LDA MESSGE,X          ; Get character
        JSR OUTCH             ; Print it
        INX                   ; Advance pointer
        CPX #LENGTH           ; Test for end of message
        BNE NEXTCH
```

ROUTINE (b) — 6502

```
        MESSHI = MESSGE/256
        MESSLO = MESSGE — 256*MESSHI
        MEND = MESSGE + LENGTH
        MENDHI = MEND/256
        MENDLO = MEND — 256*MENDHI
        LDA #MESSLO           ; Initialise Pointer
        STA MESSAD
        LDA #MESSHI
        STA MESSAD+1
        LDY #0
NEXTCH  LDA (MESSAD,Y)        ; Get character
        JSR OUTCH             ; Print it
        INC MESSAD            ; Advance pointer
        BNE TEST
        INC MESSAD + 1
TEST    LDA #MENDHI           ; Test for end of message
        CMP MESSAD + 1
        BNE NEXTCH
        LDA #MENDLO
        CMP MESSAD
        BNE NEXTCH
```

After printing a character the routine tests for the end of the message by comparing the contents of the X register with (MESSGE+LENGTH), the address of the end of the message.

The auto-increment and auto-decrement instructions are very useful in handling messages and tables of all kinds.

The operand forms are ,R+ ,R++ ,–R ,––R [,R++] [,––R] where R may be any one of the 16-bit registers X,Y,S,U. ,R+ takes the contents of the memory location pointed to by register R and then increments R; ,R++ takes the contents of the memory location pointed to by R and the next higher memory location, and increments R twice. ,–R and ,––R work similarly but register R is decremented *before* the memory reference takes place.

The indirect forms [,R++] and [,––R] use the memory location pointed to by the contents of the memory locations pointed to by R.

Indirect auto-increment and auto-decrement only increment or decrement twice because the indirection requires a two-byte operand.

CONTINUED NEXT MONTH

flags but not the actual result of the subtraction. Thus, a 16-bit comparison can be performed with a subtraction.

The Z80 has 16-bit Subtract With Carry operations but no 16-bit Subtract, without carry.

Thus routine (d) uses the instruction AND A to clear the carry flag, and SBC HL,BC to compare the contents of HL and BC. If the contents of HL and BC are equal we have reached the end of the message and jump to the end of the routine.

If we have not reached the end of the message we must remember that SBC HL,BC has altered to contents of HL, so we must restore the value of HL with the instruction ADD HL,BC before looping back for the next character.

INDIRECT AND DIRECT . . .

6809

Routine (e) will print a message of any length, and uses auto-increment addressing, which allows us to read a character and advance the pointer in one instruction.

ROUTINE (c) — Z80

```
        LD HL,MESSAGE
        LD B,0
NEXTCH  LD A,(HL)             ; Get character
        CALL OUTCH            ; Print it
        INC HL                ; Advance pointer
        INC B
        LD A,B                ; Test for end of message
        CP LENGTH
        JR NZ,NEXTCH
```

ROUTINE (d) — Z80

```
        LD HL,MESSAGE
        LD BC,MESSGE+LENGTH
NEXTCH  LD A,(HL)             ; Get character
        CALL OUTCH            ; Print it
        INC HL                ; Advance pointer
        AND A                 ; Clear Carry Flag
        SBC HL,BC             ; Test for end of message
        JR Z,DONE
        ADD HL,BC
        JR NEXTCH
DONE    . . .
```

ROUTINE (e) — 6809

```
        LDX #MESSGE
NEXTCH  LDA ,X+               Get char & advance pointer
        JSR OUTCH             Print character
        CMPX #(MESSGE+LENGTH) Test for end of message
        BNE NEXTCH
```

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MORE EMPIRES TO CONQUER

ROMAN EMPIRE

Roman Empire is the latest period war game from M. C. Lothlorien.

This Cheshire-based company have become specialists in computerised war gaming with other titles in the range such as Peloponnesian War, Tyrant of Athens, Samurai Warrior, and Japanese Challenge.

Roman Empire is a strategy war game requiring thought and application.

Graphics are therefore not as crucial to the game as they are in other games. Even allowing for this the graphics in Roman Empire are very unimpressive.

All you get are columns of figures with a list of menu options around which the game is based.

A few more illustrations would have made the various columns of figures far more accessible. The odd map would have been very much appreciated as well.

The game has now been converted for the Dragon and Atari computers and some of the above suggested improvements have now been incorporated in these new versions. Why it is not possible to upgrade the Spectrum version is anyone's guess.

The idea of the game is to conquer the six countries that are hostile to you. In order to do this you must wipe out your enemies troops. You must build up your legions and launch campaigns in the regions you are attempting to annexe.

A constant check has to be kept on your legions morale, fighting efficiency, energy level and status.

The only graphic display Roman Empire does give you is when you press the "next period" button — which totals your victories and defeats. What the display was supposed to be, however, I couldn't tell you. My girlfriend thought it looked like a screen full of ants. Any suggestions?

Confirmed war gamers may get something out of this one. For the uninitiated though — it would have to have greatly improved on-screen instructions and graphics before I would reach for my wallet.

- **Getting started** 4
- **Value** 4
- **Playability** 4

CLASSIC ALIENS BEGIN A BRAND NEW INVASION

SPACE INVADERS

The latest release from Buy-Byte for the BBC micro is a version of that granddaddy of all video games — Space Invaders.

You would not normally expect a software house to launch a copy of this classic game when several other adequate versions already exist unless it was a particularly good version. This version does not fall into that category.

Bug-Byte has not made the most of the BBC's colour and sound potential.

The machine is easily capable of producing a truly de-luxe version of Space Invaders though this cassette is sadly unworthy of that description.

The mystery saucers did not appear at the correct times and lacked the sound and movement of the arcade original.

In the games favour: it was fast and the aliens exploded cleanly when hit.

Despite this I couldn't help thinking that for £7.50 I was entitled to something more than the same old format. For an extra couple of pounds practically any game from the Acornsoft range is better value for money.

- **Getting started** 9
- **Value** 4
- **Playability** 3



REVIEWS

BEWARE THE DEADLY BUG-TRAIN!

STAR MAZE

If you fancy trying your hand at blasting a weird assortment of aliens and getting lost in the graphics of a maze then Star Maze is the game for you.

The idea of the game is to pilot your space shuttle through an enormous scrolling space maze — mining the jewels that appear every so often and taking them back to your mother ship.

The screen is divided into two sections. The left two-thirds of the screen displays the maze and your ship and the remaining third displays all relevent game information — score, high score, amount of fuel left, number of bullets left, ships, and various types of aliens drowned.

Various aliens are attempting to thwart your mission in the shape of asteroids, cruisers, and toughest of all — bug trains.

There is only one effective way to deal with the bug trains and that is to use one of your three smart bombs on them. A single bullet will only cause the bug train to split letting out a Pandora's box of nasty aliens.

You are armed with a sophisticated laser capable of single fire and also rapid fire. This enables you to use your limited supply of ammunition most effectively. You begin the game with three smart bombs but can earn an extra one each time you clear one level.

There are sixteen levels in all though you will need to be a pretty skilled space ace to get that far. After weeks of play I'm still stuck on the sixth.

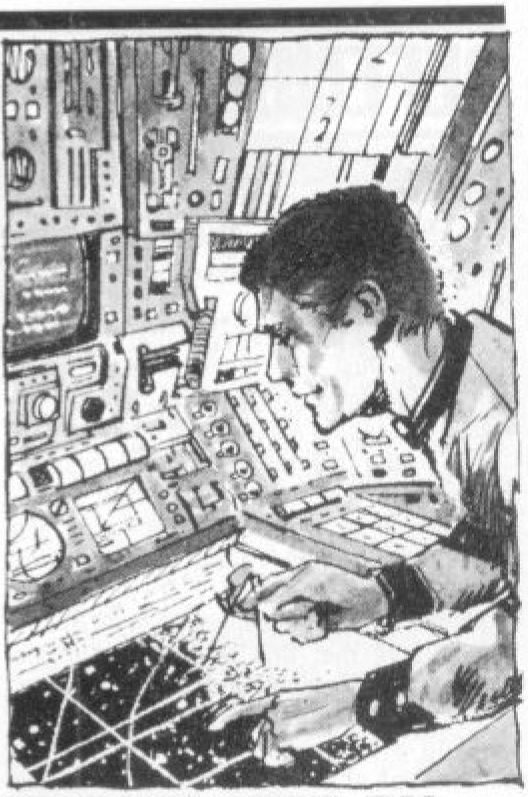
Ship control is the most difficult part of Star Maze and it took me quite some time to master the technique. You could really do with a third, or even fourth hand there are that many controls to keep a spare finger on.

You have short and long distance thrust, rotate left and right, single fire, rapid fire, hyperspace, smart bomb, and even a freeze button which enables you to pause the game to answer the phone or plan your strategy for an imminent alien onslaught. Sound and graphics are not outstanding.

I was hooked on Star Maze from the very first session. Once I'd mastered the controls the game became more and more fascinating and I can confidently recommend it as one of the best games now on sale for the Apple.

Manufactured by Sirtech for TSR the game is sold by SBD of London at £21.00.

- **Getting started** 8
- **Value** 9
- **Playability** 10



FRUSTRATED BY THESE POWERFUL SPEEDBOATS!

POWERBOAT RACE

Futura Software's Powerboat Race gives you the chance to pit your wits against the world's top powerboat racers on the BBC model B.

The program loaded first time and presented a detailed title page with full playing instructions. You are invited to enter the World Powerboat Championships. You can also choose the one or two player game and name your drivers before the computer chooses your opponent.

You'll need joysticks and 32k to play the game and I found it difficult to control the boat at first — although this was due more to the joystick than the program.

Making life more difficult on the high seas as you race along are two bobbing yellow buoys which must be negotiated to clock up those all important laps.

Each race consists of three heats of 15 laps and points are scored according to your position at the end of the race; 400 for first place, 300 for second and 200 for third. The driver scoring the most points over the three heats wins.

Screen presentation was quite good with your score and number of laps completed displayed at the bottom of the screen during each race.

The game was more frustrating than addictive because of the poor control afforded by the joysticks.

- **Getting started** 7
- **Value** 6
- **Playability** 5

Illustrations: Jon Davis

SOFTWARE SO FTWARE SOFTWAR

REVIEWS

FUN FILLED LITTLE BOXES

QIX

Remember the pure joy of scribbling? Before you were old enough to be expected to produce forms representing vases or bowls of fruit? When you were allowed to spread colour over an endless supply of pure white paper in the nursery school?

Some of that infantile anarchy is let loose in Atari's latest arcade conversion for the 400/800 home computers. The game is called Qix and will already be well known to arcade-goers.

For those of you with strict parents who turn purple when you mention your local arcade the game is simple to learn but difficult to master.

You control a marker which you must move around the screen drawing boxes. When a box is complete the computer will colour it in either red or blue — depending on the speed at which the box was drawn.

A red box is worth more points and is drawn more slowly therefore putting you at greater risk from the Qix.

This is a shape with four prongs — like the head of a fork — which bounces around the screen at random. If it careers into your marker when a box is incomplete you loose a life.

When you have boxed in 75% of the screen the Qix has insufficient room to manouevre and you then move on to a fresh screen.

Two other nasties who track you more systematically than the Qix are the Sparx. You start off with just two of these but their numbers multiply each time the red marker line at the top of the screen shrinks to zero.

Watch out for these electronic adversaries running up the lines of your boxes.

Also out to get you is the Fuse which will ignite if you stop drawing without having completed a box.

Just to make things even tougher the Qix increase in numbers as you move up through the screens.

Qix is for one or two players, retains a high score, and is in your local Atari stockists now at £29.99.

For pure originality this game shines out amongst a universe of aliens. It will not grab you from the first play — it takes time to appreciate its subtleties — but it is one very good game.

- **Getting started** 9
- **Value** 4
- **Playability** 8

NOT THE GAME OF THE FUTURE

BLIND ALLEY

Blind Alley is a snake chase type game where you have to avoid your own tail and attempt to make two pursuing snakes crash into it.

Despite this, the cassette inlay depicts a space scene and gives some blurb about Blind Alley being the sport of the future. New software house — Sunshine — are not alone in producing misleading cassette inlays. Some of the worst offenders are the established software houses.

The idea of the game is to hem in the snakes before they can do the same to you. You score a hundred points for each snake successfully crashed.

You begin with two fairly slow snakes and then progress to two quicker ones, then four snakes and so on. Trouble is its all rather slow. The snakes are difficult to control with the keyboard and, if you accidentally press the wrong key they have the annoying habit of disappearing.

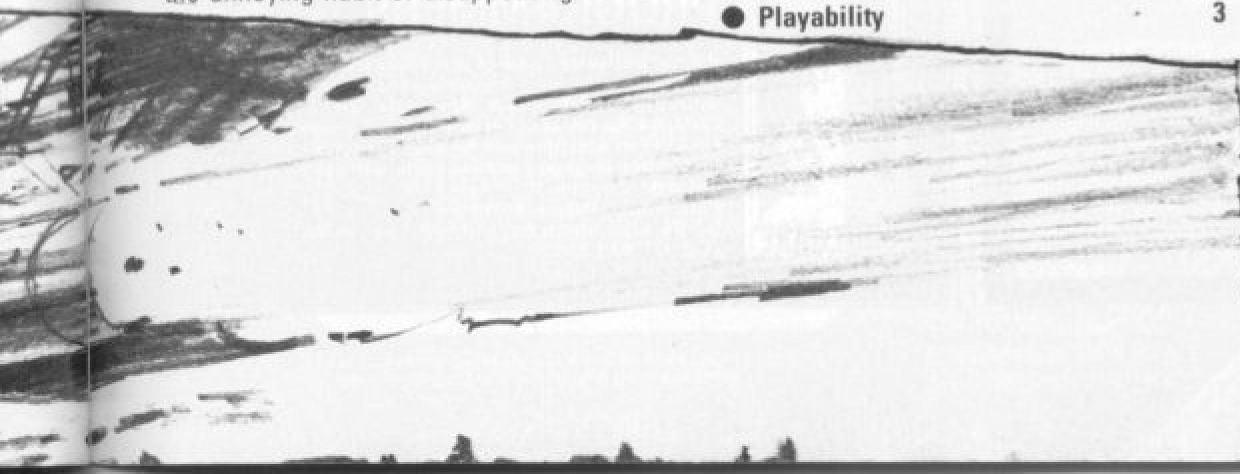
The graphics were not the most colourful I have seen on the Spectrum to say the least. I also felt that the game would have been much better if you had something, or things, to gobble up as you guided your snake around the screen.

It is not possible in Blind Alley to rectify a mistaken move by steering yourself out of trouble — instead you must start all over again from the beginning.

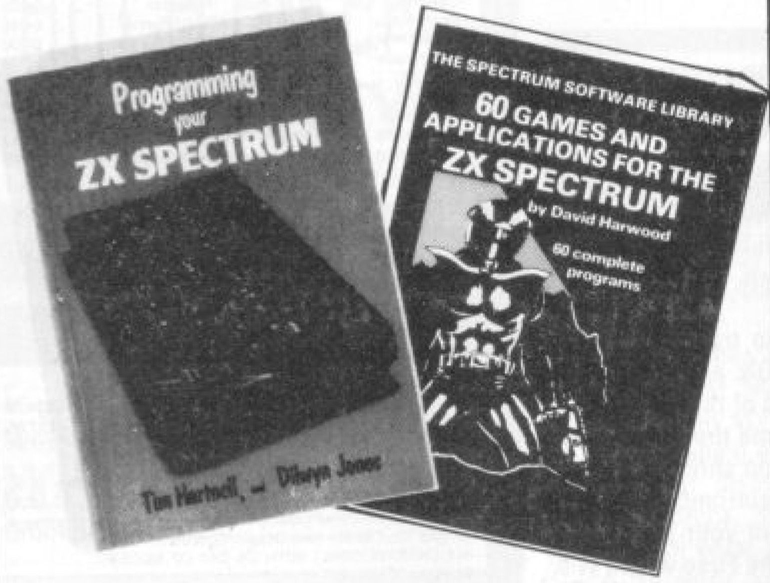
About the only good feature of Blind Alley was the high score board which enabled you to write your name in full, congratulated you on a high score, and kept a 'Hall of Fame."

Blind Alley is available from Sunshine Software at £4.95 and runs on the Sinclair Spectrum in 16 or 48K.

- **Getting Started** 8
- **Value** 3
- **Playability** 3



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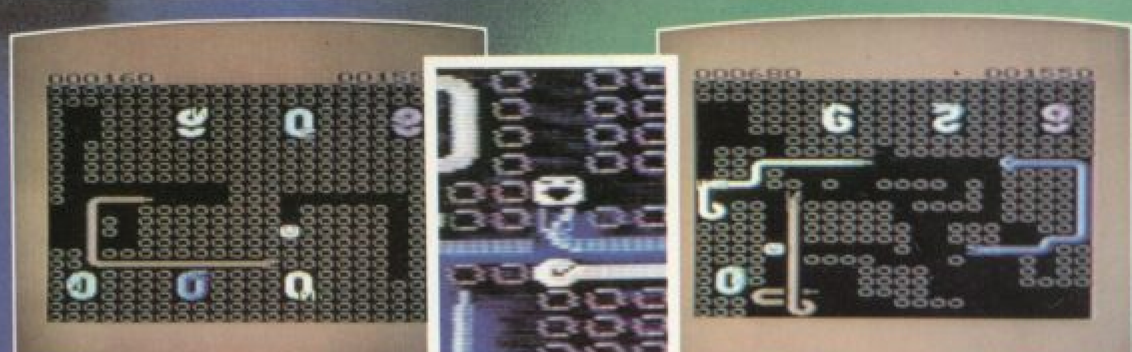
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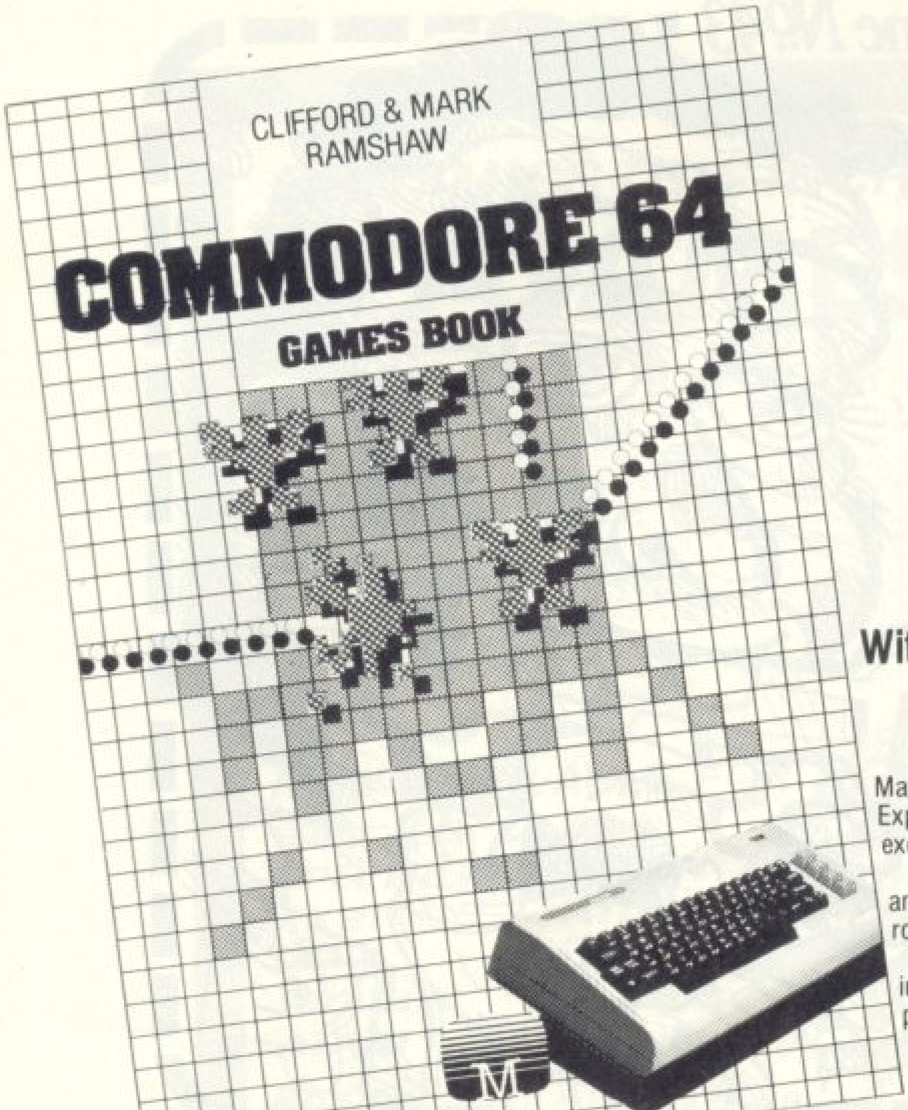
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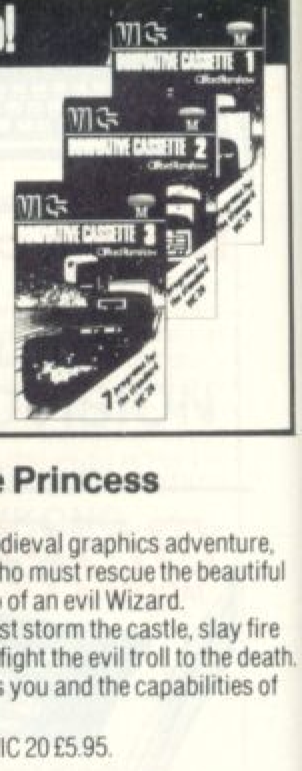
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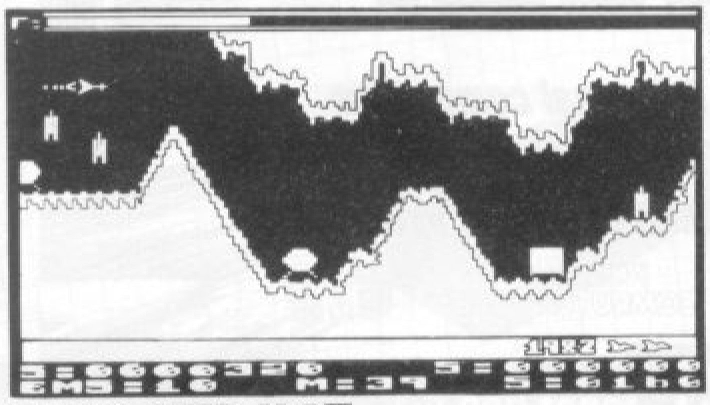

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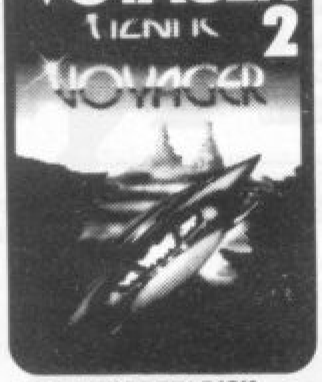
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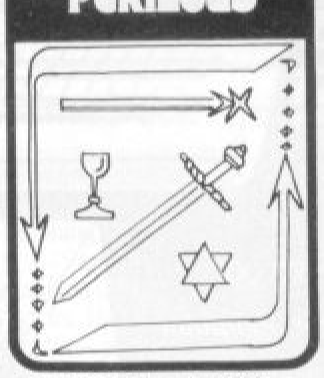
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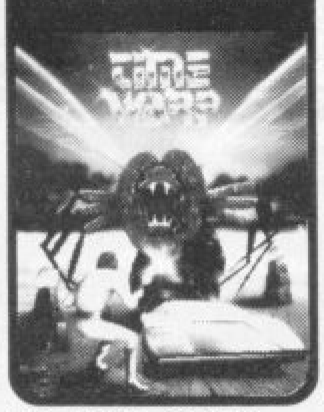
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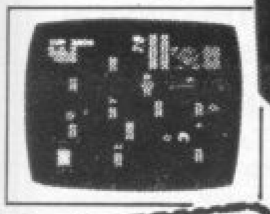


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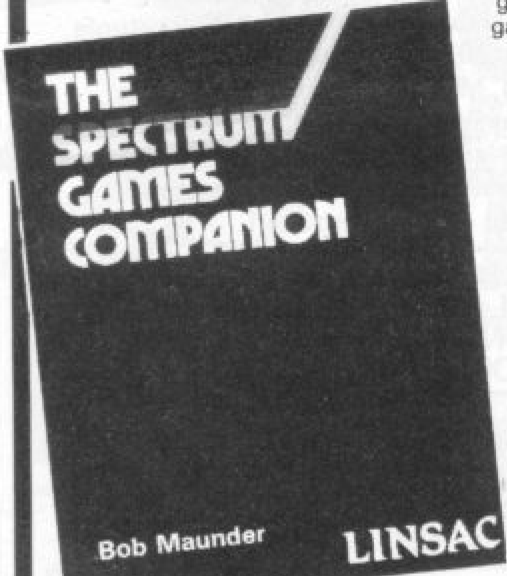
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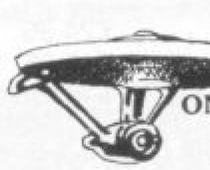
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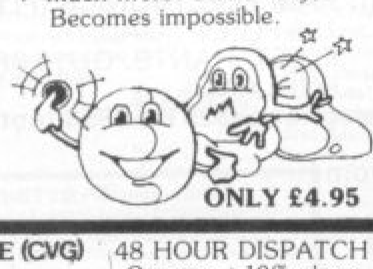
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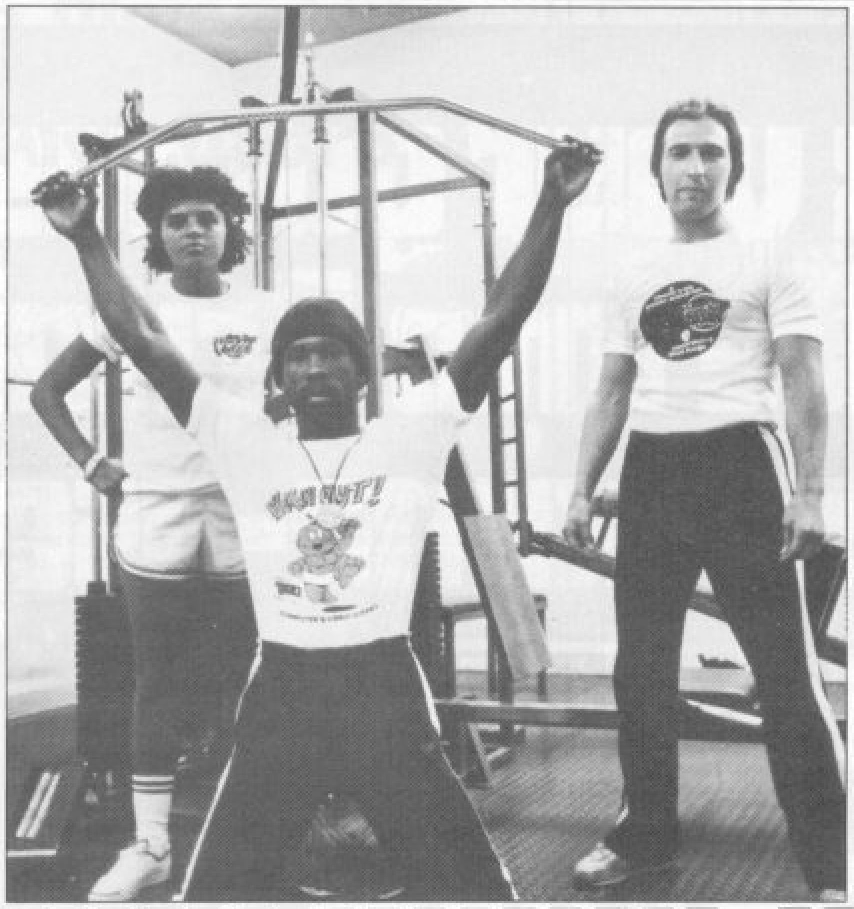
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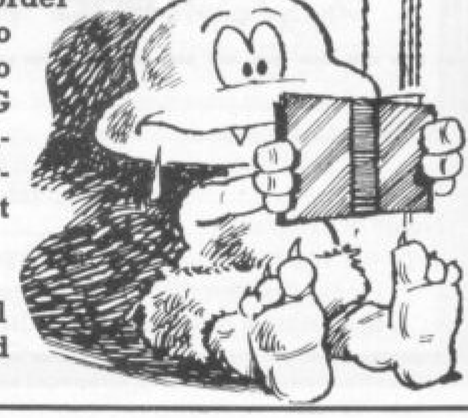
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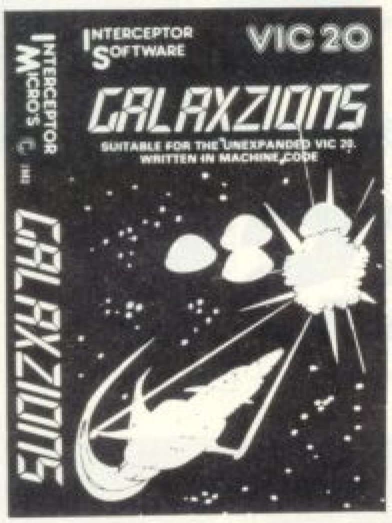
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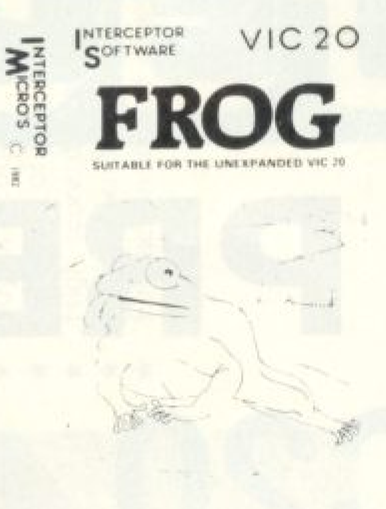
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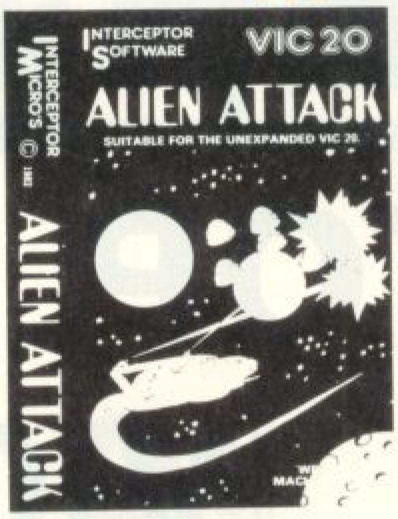
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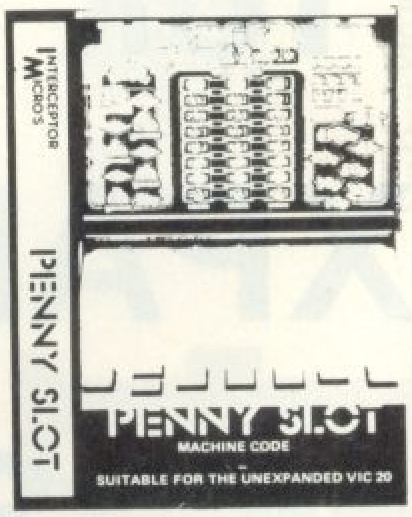
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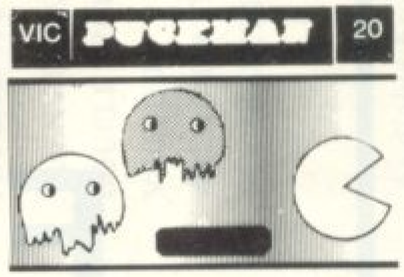
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